The
Electrical Review

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Index to Advertisers—Page lxiv.

Principal Contents:

	PAGE
Widening the Field	229
British Industries Fair	231
Plan of Electrical Section	232
List of Exhibitors	233
The Birmingham Exhibits	234
The London Exhibits	252
The Birmingham Electrical Centre and Functions	255
Industrial Research	255
Parliamentary News	256
In the Courts	256
Earthing in Rural Systems	257
The Institution Dinner	257
Meetings and Discussions	258
Correspondence: The Age Limit Problem; Compulsion for Contractors; Multiple Earthing; Too Many Technical Terms; Loughborough College Power Supply; The Future of the Tramways; Recent Testimonials; The Promotion of Engineers	261
Business Notes	263
Electricity Supply	266
Contract Information	269
Our Personal Column	271
Financial Section	272
Published Specifications	275
New Work for Contractors	276

Widening the Field

THAT the future of electricity lies in promoting its utilisation rather than in improving methods for its production (however important that will always be) is now generally regarded as a truism. Many men of eminence have stressed this aspect of our work for many years past, and the truth of the dictum is now very obvious.

It was evident, however, from Mr. H. T. Young's speech at the I.E.E. dinner last week, just as it was from his presidential address in October, that he does not regard it as enough to preach to the converted, although these may well be encouraged to further efforts, nor even to members of the public at large, as these require guidance from their advisers, belonging to all manner of professions, when the time comes for money to be spent; these advisers must be induced to choose electricity for their clients.

The examples of notable recent applications of electricity chosen by Mr. Young are significant. They include the new London University building, which he regards as the most completely electrified in this country; the new R.I.B.A. headquarters; the million-volt X-ray equipment at Bart's, the first approaching that output to be manufactured in Britain; and the proposal to install air-conditioning plant at Grosvenor House. The last would evidently have added to the comfort of his large audience on the warm evening, in spite of the spaciousness of the accommodation provided at the old skating rink, on which the banquet was held.

Pertinent to his main theme was the hope he expressed that a paper on the use of electricity in surgery would be delivered before the Institution in the early part of next autumn. Another point of particular interest to those who have long been troubled with the question of how to dispose of household refuse in fully electrified houses and flats was his anticipation of a solution of the problem—an electrical one—within the next two or three years.

The background of the President's speech was that the utilisation of electricity requires to be extensively, as well as intensively, developed, and that, with this end in view, the electrical industry should arouse the interest and seek the help of allies in every field. Electrification should not be regarded merely as providing a substitute for other methods of doing the same thing. It should also be looked upon as an agency capable of performing services that cannot be accomplished in any other way.

Co-operation with architects, builders and the medical profession, and, we would add (in view of E.L.M.A.'s successful activities), with opticians, has already been fruitful, but much more is possible through these channels. This list by no means exhausts the roll of potential workers that the electrical industry should be able to call to its aid, but it is enough by itself to influence enormously both the number of consumers connected and the kilowatts installed.

Electrical men will continue to broaden their own outlook and so win the co-operation of others in extending the uses of electricity.

BRITISH INDUSTRIES FAIR

A survey of the industrial and domestic exhibits at Birmingham, prepared by our Staff representatives, will be published in next week's

"ELECTRICAL REVIEW"

Readers visiting Castle Bromwich are invited to call at our stand (Cb 808).

Electricity and Health

A GOOD subject has been chosen for this year's Faraday Lecture, which was given for the first time on Monday before the Mersey and North Wales (Liverpool) Centre of the Institution of Electrical Engineers. The interest of "Electricity in the Hospital" was by no means confined to a specialised field, as Mr. R. S. Whipple, with the aid of lantern slides and demonstrations, covered the whole range of the aid which electricity can give in the promotion of health and the curing of disease. It was thus popular in character in the best sense of the word, since all are concerned with physical fitness. For that very reason it is important that a knowledge of the potentialities of electricity should be widely disseminated. Too many charlatans have used electricity and magnetism as a means of preying upon a credulous public naturally desirous of maintaining or regaining its health. What electricity can do under skilled direction may be even more marvellous than the quacks have claimed for their misapplications of it, even if the actual results appear less sensational.

Approved Meters

FROM time to time the Electricity Commissioners have announced that certain electricity meters have received their approval. As from an "appointed day," under the Meters Act of last year, only such meters will be permissible for the registering of energy supplied by electricity authorities to new or reconnected installations. This has been pointed out by the Commissioners in a letter sent to all supply undertakings, which is accompanied by a schedule detailing the approved patterns supplied by about twenty manufacturers. It is also stated that the Minister of Transport hopes to fix the appointed day in the earlier part of this year—which must mean very soon.

The Gresford Inquiry

SIR HENRY WALKER, the Chief Inspector of Mines, does not reach a definite conclusion as to the cause of the explosion at Gresford pit in December, 1934, but he attaches great importance to the inadequate ventilation provided. In view of the mention made by the Electrical Inspector of Mines (Mr. J. A. B. Horsley) in his report for the same year that uncertified signalling bells were still to be found in safety-lamp mines, the recommendation made by Mr. J. Brass, one of the assessors, that telephones and similar apparatus in such mines should be of a type approved by the Mines Department is significant. Mr. Brass also calls for consideration to be given to the use of a proportion of electric safety lamps where oil safety lamps are now in use. Sir Henry Walker drew attention to a statement of the manager of the pit that he had nobody with whom he could consult on technical matters. The inference is obvious.

Radio in Flats

UNDER the Wireless Telegraphy Act of 1904 a licence is required for the working of radio apparatus. The High Court had to decide last week whether the use of a loud speaker in a flat imposed an obligation upon the user to take out a licence. A London magistrate, contrary to the opinion of the Postmaster-General, had ruled otherwise. The two points at issue were whether a loud speaker was "apparatus" and whether the mere operation of plugging it into a circuit was "working" it. The Court ruled in the affirmative on both points, which was what we expected it to do. It was established long ago that the clients of a radio relay system were obliged to purchase individual licences. The distribution of radio programmes from a central receiver to individual loud speakers in a block of flats is, after all, merely a small relay system, and so the same principle would seem to hold. If the Court's decision had been otherwise, the Post Office and the B.B.C. would have lost a good deal of revenue, with the possibility of an even greater loss if an alteration in the existing procedure in relation to relay systems was necessitated.

Restriction at Aberdeen

IN order to "hold the balance evenly" between the Council's electricity and gas undertakings, the Aberdeen Finance Committee recently persuaded the Council to adopt a recommendation that in its housing schemes electricity should be used for lighting only and gas for cooking and water heating. The Electricity Committee has evidently been ignoring this and has had the effrontery to hire out electric cookers to some of the Council's tenants. This was termed "cadging for business." We should describe it as an attempt to redress the balance which the Finance Committee weighted rather heavily on the gas side. The Council decided last week to reconfirm the Committee's recommendation. During the discussion it was mentioned that Aberdeen was still without a city electrical engineer. It will be recalled that the post was recently advertised, but the salary offered was considered inadequate by the A.M.E.E. and E.P.E.A. We hope that Aberdeen is not becoming a "black spot" in the electrical sense.

Yet Another Association

ON another page we report the establishment of the National Association of Electrical Retailers under the auspices of N.E.C.T.A., Ltd., one of the E.C.A. allied organisations. This is designed to protect the interests of those who are electrical *retailers*; the membership of the parent body comprises contractors who are also retailers. We notice that "persons, firms or companies genuinely in business either wholly or *partly* as electrical retailers" are eligible for membership, and so the new body is spreading its net over a wide area.

Cold Spells

ELECTRIC fires are regarded by some undertakings with uneasiness as potential additions to the peak during unexpected periods of low temperature. If cold "snaps" were foreseeable, some of the difficulty of meeting them might be removed. According to the *Agricultural Note Book*, however uncertain the weather may be at other times, a cold period occurs with singular regularity each year for a week or so beginning between February 5th and 7th and ending between February 12th and 14th. An authority on farming informs us that records he has kept for nearly thirty years bear out this statement and that exceptions are uncommon. The week that has passed has provided an example, and it would be of interest to learn whether the experience of electrical engineers accords with that of farmers.

The Brighton Ljungstroms

STEAM turbines of Ljungstrom design have long enjoyed an excellent reputation in the smaller sizes, small in relation to modern generation practice, that is. Mr. W. N. C. Clinch, borough electrical engineer and manager, Brighton, had sufficient faith in their ability to cope with greater outputs to order two British-built units of 37,500 kW each from the Brush Company. The first of these was put on commercial load on February 4th, and at the time of going to press was carrying 25,000 kW of the station load and impressing the station staff with its balance and steadiness of running. The Brighton sets have a considerably greater output than any so far built in this country, the largest size hitherto having been 15,000 kW.

In Belgium Too

WE recently recounted the experiences of a family who moved into a new house and were desirous of installing electricity for a number of purposes, but were persuaded to use gas by the greater willingness to serve shown by the local gas company. Our Brussels contemporary *Eclairage et Force Motrice* quotes our comment and says that this sort of thing happens in Belgium too. It recommends electricity supply undertakings to abandon their bureaucratic methods and take steps to inculcate into all their representatives a "*mentalité plus commerciale.*"

BRITISH INDUSTRIES FAIR

Birmingham and London, February 15th-26th

IN this and succeeding pages we present a plan of the Electrical Section at Castle Bromwich, Birmingham; a list of the exhibitors of electrical and allied equipment at Birmingham and in London; descriptive notes of the exhibits; and a list of the functions which have been arranged in connection with the Fair.

IF we may judge from the opinions expressed in the trade and from the fact that the number of exhibits of electrical products is larger than ever before, there is every likelihood of the Fair which opens on Monday next at Castle Bromwich being the most successful ever held there.

The continuous growth of the Engineering and Hardware Section—the official description of the Birmingham part of the Fair—must be gratifying to the Birmingham Chamber of Commerce and to Mr. C. Elliott, the general manager of the Fair, and the progress of the Electrical Section must give satisfaction to the Electrical Advisory Committee. But the growth of the Electrical section is particularly pleasing to the ELECTRICAL REVIEW. Those who recall into what low water the Section had slumped will remember that in the autumn of 1925 abandonment was more than a mere possibility. It was then that the Editor of the REVIEW, at the suggestion of Mr. T. R. Martin and the Birmingham Chamber of Commerce, lent full co-operation to infuse new life into the undertaking.

What happened was recorded in these pages at the time and can be consulted by those who are interested. By speech and by article we urged the setting up of a representative committee of the several electrical trade associations, and an immediate canvass of manufacturers to secure their support in taking space. A well-known electrical engineer was appointed to undertake this latter duty, and with our strong backing the movement took on new life within a few months. Since then there has been no looking back.

When the first of the Fairs was being organised in London in 1915 we inquired of Government officials who were responsible for it why electrical exhibits had no place allotted to them, and the answer was that there was no room, and electrical men who wandered round the early shows at the Royal Agricultural Hall and at Kensington, and elsewhere, deplored the absence of goods in which they were interested.

Though there was officially "no room" to show what British electrical manufacturers were able to make, the Board of Trade availed itself very freely of our assistance in ascertaining upon what lines of "enemy" products Britain had allowed herself to become dependent and where substitutes could be obtained especially during the early days of the emergency, and official exhibitions of cheap imported electrical goods took place in the City. This movement and the Fair itself were largely interlocked, but both of them early convinced us of the need for an annual concentrated demonstration such as is now growing from year to year in the Electrical Section at Castle Bromwich. If we believed in the undertaking then, we do so even more enthusiastically to-day.

In subsequent years, in co-operation with the Birmingham Chamber of Commerce and with representatives of the Department of Overseas Trade, we have continued to stress the importance of the Fair as an annual trade market event for the effective display of the electrical products of British manufacturers. Likewise, by means of special arrangements, we have, when required, used our influence with readers of the ELECTRICAL REVIEW in all the markets overseas to persuade them to time their visits Home so that they could see in one place at one time representative lines which otherwise they could not have inspected without spending many weeks in journeyings to works and showrooms in different parts of the country.

As the Fair increases in size and popularity among the trade, so its value as a business-getting event naturally grows because of its attractions for the buyer. Further progress is sought, and, notwithstanding the larger dimensions of the 1937 display at Birmingham, there is a very definite desire that the advance should continue henceforth from year to year until the exhibits reach at least double their present number. Those who are familiar with the subject know that since 1926 there have been ups and downs, but the curve of progress of the Electrical Section shows far more upward than downward movement.

The desire to meet the convenience of the overseas buyer with regard to date has been ever present and has given rise to much discussion. There still exists a feeling on the part of some producers that February is the wrong month and that May would be better, but, whatever opinion may be held on that point, there seems to be a general expectation that the Fair of February in Coronation Year will be a well-worth-while event, and we urge our readers at Home to avail themselves of the opportunity of seeing under very convenient conditions the magnificent collection of electrical equipment, apparatus and appliances that will be thrown open to their inspection at Castle Bromwich on Monday next, February 15th at 10 a.m. London will have its vast displays of British-manufactured goods of many kinds, including a number of electrical lines.

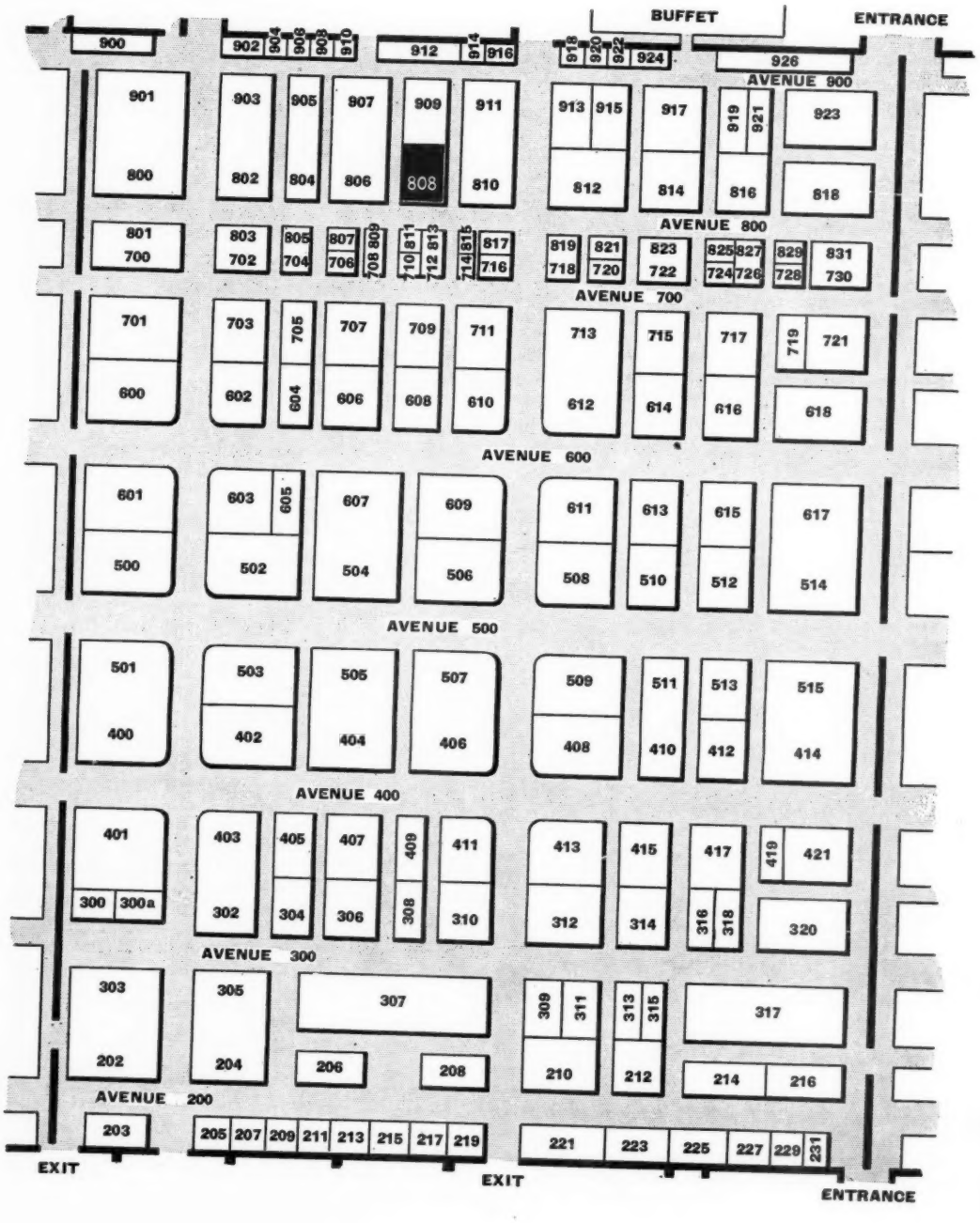
On Monday evening the customary dinner will be given by His Majesty's Government at the Mansion House to mark the opening of the Fair. The Duke of Kent will be present, and Mr. Walter Runciman, M.P., President of the Board of Trade, will preside. Always a brilliant function, with the presence of ambassadors and many diplomatic representatives from other countries, the proceedings should be particularly so this time, for not only is it Coronation Year, but there is prosperity in the air and international trade agreements and inter-Imperial trade questions are very much to the fore. The event should give a good send-off to a profitable run from February 15th to 26th in all sections.

In following pages of the ELECTRICAL REVIEW we are publishing for the convenience of visitors and readers generally a plan of the exhibits in the Electrical Section at Castle Bromwich, together with a name-index of the electrical exhibitors both in this and other sections. We also give an advance descriptive account of the goods exhibited; this will be followed, next week, according to our usual practice, with a review of interesting features noted by our own staff representatives as they make their technical investigations of industrial, domestic and other products.

With Mr. Martin and his Committee we still look forward, as we did in 1925 and 1926, to an accelerated pace of progress now that he has proved so unmistakeably that it has a permanent place in the electrical industry. On page 255 we give the names of the Electrical Advisory Committee and a list of functions at Birmingham.

Plan showing stands in the ELECTRICAL SECTION at Birmingham

(ELECTRICAL REVIEW Stand No. Cb808 shown black)



List of Exhibitors

BELOW we give a list of the exhibitors of electrical and allied products at both the Birmingham and London Sections of the Fair. The majority of the Castle Bromwich exhibitors mentioned will be found in the Electrical Group (Cb), a plan of which appears on the opposite page, but there will also be a number in the Hardware (A), Building (B) and Engineering (D) Groups. In the London Section all the electrical exhibitors will be found at Olympia with the exception of the very few indicated at the White City.

Birmingham

Accles & Pollock, Ltd.	D 812 & 915
Aerospray Manufacturing Co., Ltd.	D 920
Aerostyle, Ltd.	B 908
Aladdin Industries, Ltd.	B 517
Alklum Storage Batteries, Ltd.	Cb309
Allen, Edgar, & Co., Ltd.	D 730 & 831
Allen West & Co., Ltd.	D 206
Anchor Cable Co., Ltd.	Cb400 & 501
Arrow Electric Switches, Ltd.	Cb711
Associated Equipment Co., Ltd.	D 820
Avery, W. & T., Ltd.	D 512 & 613
Babcock & Wilcox, Ltd.	D 400 & 501
Bakelite, Ltd.	Cb508
Baldwins, Ltd.	Cb412
Barrett & Elers, Ltd.	A 305
Batteries, Ltd.	Cb913
Beatty Bros., Ltd.	B 814 & 913
Becker, F. E., & Co.	Cb715
Beetle Products Co., Ltd.	Cb305
Belling & Co., Ltd.	Cb413
Belling & Lee, Ltd.	Cb724
B.E.N. Patents, Ltd.	B 736 & 825
Berry's Electric, Ltd.	Cb307
Bi-Metals	Cb811
Bingham Appliances, Ltd.	Cb726 & 827
Birkby's, Ltd.	Cb411
Birmingham Electric Furnaces, Ltd.	Cb320
Birmingham Electric Supply Dept.	Cb506
Black & Decker, Ltd.	Cb923
Bowker, S. O., Ltd.	Cb417
Bray, Geo., & Co., Ltd.	Cb405
Brightside Plating Co., Ltd.	Cb909
Britannia Batteries, Ltd.	Cb603
Britannia Electric Lamp Works, Ltd.	Cb315
Britannia Tube Co., Ltd.	D 422 & 521
British Aluminium Co., Ltd.	D 808 & 911
British Electric Domestic Appliances, Ltd.	Cb318
British Elecl. Development Association Inc.	Cb406 & 507
British Industrial Plastics, Ltd.	Cb204
British Insulated Cables, Ltd.	Cb400 & 501
British Oxygen Co., Ltd.	D 324, 410 & 511
British Rema Manufacturing Co., Ltd.	D 804
British Sangamo Co., Ltd.	Cb502
British Thermostat Co., Ltd.	Cb900
British Thomson-Houston Co., Ltd.	Cb504 & 607
British Trane Co., Ltd.	B 418
British Vacuum Cleaner & Eng. Co., Ltd.	Cb309
Briton Lamps, Ltd.	Cb924
Bromak Pneumatic Paint Brush, Ltd.	Cb708 & 809
Broughton, J.	Cb421
Bulpitt & Sons, Ltd.	Cb510
Burco, Ltd.	Cb415
Cable Makers' Association	Cb400 & 501
Callender's Cable & Construction Co., Ltd.	Cb400 & 501
Canning, W., & Co., Ltd.	Cb317
Carron Company	Cb304
Carter & Co. (Nelson), Ltd.	Cb710
Cellon, Ltd.	B 625
C.H. Supplies, Ltd.	Cb714 & 815
Chloride Electrical Storage Co., Ltd.	Cb407
Clang, Ltd.	Cb914
Clear Hooters, Ltd.	Cb714 & 815
Cole, E. K., Ltd.	Cb926
Coleman & Appleby, Ltd.	Cb314
Commutator Grinding Block Co.	Cb918
Concordia Electric Safety Lamp Co., Ltd.	Cb603
Constructors, Ltd.	Cb608
Craigpark Electric Cable Co., Ltd.	Cb400 & 501
Crockatt, W., & Sons	B 902
Daniels, T. H. & J., Ltd.	Cb231
Desoutter Bros., Ltd.	Cb401
Diamond H. Switches, Ltd.	Cb816
Dominion Machinery Co.	B 423
Donovan Electrical Co., Ltd.	Cb409
Drew, Clark & Co.	A 330
Dubilier Condenser Co. (1926), Ltd.	Cb718 & 819
Duroglass, Ltd.	Cb613
Duro-Ray, Ltd.	Cb613
Earle, Bourne & Co., Ltd.	D 600
Eaves, Thos., Ltd.	Cb402
Edison Swan Cables, Ltd.	Cb400 & 501
Electrical Review	**Cb808**
Electricars, Ltd.	Cb810 & 911
Elliott, E., Ltd.	Cb513
Enfield Cable Works, Ltd.	Cb400 & 501
Enfield Rolling Mills, Ltd.	D 419
English Electric Co., Ltd.	Cb609
Ether, Ltd.	Cb716 & 817
Evershed & Vignoles, Ltd.	Cb313
Falcon Plate Works	Cb829
Falk, Stadelmann & Co., Ltd.	A 506
Fastnut, Ltd.	B 904
Ferranti, Ltd.	Cb612 & 713
Fitz-Gibbon & Murray, Ltd.	Cb821
Flextol Engineering Co., Ltd.	Cb704 & 805
French, W. T., & Son	A 623
Gascoignes (Reading), Ltd.	B 712
General Electric Co., Ltd.	Cb514 & 615
General Refractories, Ltd.	D 810 & 913
Gent & Co., Ltd.	Cb606
George, W. & J., Ltd.	Cb715
Gilman, F. (B.S.T.), Ltd.	Cb618
Gittings & Hills, Ltd.	B 721
Glover, W. T., & Co.	Cb400 & 501
Gordon, James, & Co.	Cb716 & 817
Grant & West, Ltd.	Cb311
Greengate & Irwell Rubber Co., Ltd.	Cb400 & 501
Greenwood & Batley, Ltd.	D 314 & 413
Guest, Keen & Nettlefolds, Ltd.	B 606
G.W.B. Electric Furnaces, Ltd.	Cb302 & 403
Hague & McKenzie, Ltd.	Cb500
Halden, J., & Co., Ltd.	Cb722 & 823
Harvey, G. A., & Co. (London), Ltd.	B 622 & 723
Hawkins, L. G., & Co., Ltd.	Cb615
Heayberd, F. C., & Co.	Cb728
Henley's, W. T., Telegraph Works, Co., Ltd.	Cb400 & 501
Herbert, Alfred, Ltd.	D 404 & 409
Higgs Motors, Ltd.	Cb408
Holden & Hunt	Cb802 & 903
Hotpoint Electric Appliance Co., Ltd.	Cb600
Hurley Machine Co. (Eng.), Ltd.	B 814 & 913
Iceland Freezer Co.	Cb916
I.C.I. Metals, Ltd.	D 402 & 503
Imperial Chemical Industries, Ltd.	D 306
India Rubber, Gutta Percha & Telegraph Works Co., Ltd.	Cb400 & 501
International Combustion, Ltd.	D 202 & 303
Ioco Rubber & Water-Proofing Co., Ltd.	Cb730 & 831
Jackson Electric Stove Co., Ltd.	Cb509
Johns, Walter, Ltd.	Cb229
Johnson, Matthey, & Co., Ltd.	Cb312
Johnson & Phillips, Ltd.	Cb400 & 501
Johnson, Richard, & Nephew, Ltd.	D 700 & 801
Kitchendom, Ltd.	A 702
Klaxon, Ltd.	Cb316
Landale & Co.	B 300
Leda Electric, Ltd.	Cb705
Leek, E. & J., Ltd.	Cb720
Liverpool Electric Cable Co., Ltd.	Cb400 & 501
London Aluminium Co., Ltd.	A 408 & 511
London Electric Wire Co., & Smiths, Ltd.	Cb400, 501 & 610
Lucas, Joseph, Ltd.	Cb601
M. & C. Switchgear, Ltd.	Cb602
MacGregor & McCallum, Ltd.	B 814 & 913
Macintosh Cable Co., Ltd.	Cb400 & 501
Macpherson, Donald, & Co., Ltd.	B 623
Mansions Motor Co., Ltd.	D 908 & D North Outdoor
Martindale Electric Co., Ltd.	Cb807
M.C.L. & Repetition, Ltd.	D 506
Meldrums, Ltd.	D 212
Metalectric Furnaces, Ltd.	D 226 & 327
Metlex Industries, Ltd.	A 420
Metropolitan-Vickers Electrical Co., Ltd.	Cb806
Midland Fan Co., Ltd.	A 716
Mirrlees, Bickerton & Day, Ltd.	B 420
Moffats, Ltd.	Cb611
Morrison, A. E., & Sons, Ltd.	Cb812
Morse Chain Co., Ltd.	D 704 & 805
Moseley, David, & Sons, Ltd.	D 719
Moulded Products, Ltd.	Cb300a
National Time Recorder Co., Ltd.	B 319
Neill, James, & Co. (Sheffield), Ltd.	D 625 & 627
New Process Welders, Ltd.	Cb221
Orme, Evans, & Co., Ltd.	Cb700 & 801
Osborn Manufacturing Co., Ltd.	Cb814
P.B. Sillimanite Co., Ltd.	Cb604
Peace, Henry, Ltd.	Cb712 & 813
P. & H., Ltd.	Cb601
Perkins Clean Milk Equipment, Ltd.	A 725
Philips Lamps, Ltd.	Cb912
Pinchin, Johnson & Co., Ltd.	B 414 & 515
Pirelli-General Cable Works, Ltd.	Cb400 & 501
Poles, Ltd.	Cb709
Power Centre Co., Ltd.	Cb712 & 813
Precision Electric, Ltd.	B 314
Pressed Steel Co., Ltd.	Cb721
Quaker, Silas, Ltd.	Cb914
Radiovisor Parent, Ltd.	Cb419
Rapid Magnetting Machine Co., Ltd.	Cb512
Rawlplug, Ltd.	Cb308
Redmanol, Ltd.	Cb508
Revo Electric Co., Ltd.	Cb404 & 505
Rheostatic Co., Ltd.	Cb410 & 511
Richardson, H. G., & Sons, Ltd.	Cb613
Rotax, Ltd.	Cb601
Rudd, E., & Co., Ltd.	Cb300
Runbaken Elecl. Products	Cb910
Ruston & Hornsby, Ltd.	D 318
St. Helen's Cable & Rubber Co., Ltd.	Cb400 & 501
Sankey, Jos., & Sons, Ltd.	A512 & B707
Siemens Bros. & Co., Ltd.	Cb400 & 501
Siemens Electric Lamps & Supplies, Ltd.	Cb607
Simon, Henry, Ltd.	D 611
Simplex Electric Co., Ltd.	Cb414 & 515
Small, W. R., Ltd.	Cb825
Smith, Fredk., & Co.	Cb610
Smith Meters, Ltd.	Cb202 & 303
Speedway Suction Washer Co., Ltd.	Cb916
Standard & Pochin Bros., Ltd.	B 728 & 817
Standard Telephones & Cables, Ltd.	Cb400 & 501
Steam Gauge Mfg. Co., Ltd.	D 710 & 811
Stewarts & Lloyds, Ltd.	D 500 & 601
Stirling Boiler Co., Ltd.	D 400 & 501
Stone, J. B., & Co., Ltd.	D 302
Streetly Manufacturing Co., Ltd.	Cb204 & 305
Strong & Co.	Cb717
Supremus Specialities, Ltd.	Cb706
Taylor & Challen, Ltd.	D 509
Taylor, Taylor & Hobson, Ltd.	D 708 & 809
Tecalemit, Ltd.	D 414 & 515
Telegraph Construction & Maintenance Co., Ltd.	Cb503
Terry, Herbert, & Sons, Ltd.	B 520
Thomas, Bertram	D 200
Thompson, John, (Wolverhampton), Ltd.	D 806 & 909
Timmis & Co., Ltd.	Cb702 & 803
Tube Products, Ltd.	D 615
Tubes, Ltd.	D 608 & 709
Tuscan Engineering Co.	Cb922
Union Cable Co., Ltd.	Cb400 & 501
United Steel Companies., Ltd.	D 612 & 713
Universal Boiler & Engineering Co., Ltd.	Cb703
Vacuum Oil Co., Ltd.	D 427
Van Dorn Electric Tools	Cb923
Versil, Ltd.	Cb818
Waddicor (Bradite), Ltd.	Cb707
Wakefield, C. C., & Co., Ltd.	D 507
Walmsley Patent Lamp Co., Ltd.	Cb921
Ward, H. W., & Co., Ltd.	D 415
Webb's Crystal Glass Co.	Cb613
West Lancashire Refrigeration Co., Ltd.	B 814 & 913
Westinghouse Brake & Signal Co., Ltd.	Cb614 & 616
Wild-Barfield Electric Furnaces, Ltd.	Cb302 & 403
Wilkins & Mitchell	Cb719
Williams (Birmingham), Ltd.	Cb605
Wilson, Thwaits & Kininmouth	Cb227
Wolf, S., & Co., Ltd.	Cb310
Wolseley Sheep Shearing Machine Co., Ltd.	D905
Worsdall Mercury Co.	Cb229
Young Accumulator Co., Ltd.	Cb902

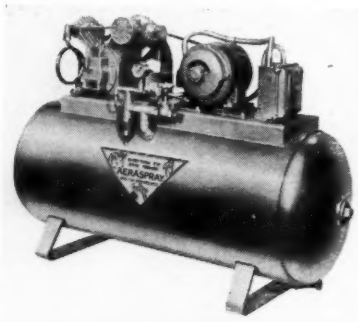
London

Air-Glow Lights, Ltd.	K 1336
Aladdin Industries, Ltd.	F 766
Allen & Hanburys, Ltd.	A 152
Ashdown, H. E., (Birmingham), Ltd.	F 702
"Attracta" Electrical Co.	K1337
Baird Television, Ltd.	G 934
Bakelite, Ltd.	F 703
Baker, Charles	A 148
Beck, R. & J.	A 138
Belgrave Electric Co., Ltd.	F 725 & White City 1718
Bellingham & Stanley, Ltd.	A 52
British Electric Domestic Appliances, Ltd.	H1015
British Plastics Federation, Ltd.	707
British Vacuum Cleaner & Engineering Co., Ltd.	H1006
Brook, J. A., Ltd.	D 504
Bylock Electric, Ltd.	H1001
Cable & Wireless, Ltd.	A 255
Cole, E. K., Ltd.	F 846
Crayonne, Ltd.	F 841
Daniels, T. H. & J., Ltd.	F 849
Dent, R. H., Ltd.	A 29
De la Rue, Thomas & Co., Ltd.	B 341 & 353
Dernier & Hamlyn, Ltd.	F 807
Dictograph Telephones, Ltd.	F 711
Dominion Electrical Co.	K1332
Eastick, J. J., & Sons	G 943
Ebonestos Insulators, Ltd.	F 700
Electric Art Shades (1928), Ltd.	F 781
Elliott, F. W., Ltd.	E 627
Foote, Richard W., Ltd.	F 732
Garrard Clocks, Ltd.	E 638
General Chemical & Pharmaceutical Co., Ltd.	A 191
General Mouldings Co., Ltd.	F 842
Gestetner, D., Ltd.	F 714
Hanovia, Ltd.	A 108
Heayberd, F. C., & Co.	G 936
Hoover, Ltd.	H1110
Hughes, F. A., & Co., Ltd.	F 843
Ideal Home Electrical Appliances, Ltd.	A 53
Imperial Chemical Industries, Ltd.	A 170 & 174
Injection Moulders, Ltd.	F 848
Insulators, Ltd.	F 845
Johnson, Matthey & Co., Ltd.	D 565
Kent Mouldings	F 704
K.F.M. Engineering Co., Ltd.	K1348
Kitchendom, Ltd.	White City 1706
Knightshades, Ltd.	F 826
London Electric Clock Co.	E 605
Lusty, W., & Sons, Ltd.	F 790
Marconi-Ekco Instruments, Ltd.	A 106 & 120
Mayfair Shades, Ltd.	F 827
Mouldrite, Ltd.	F 705
Multitone Electric Co., Ltd.	G 926
New Radiant, Ltd.	K1327
New Welbeck, Ltd.	H1005
Norma Technical Products, Ltd.	E 606
Philco Radio & Television Corporation of Great Britain, Ltd.	G 938
Redferns, J., Ltd.	H 1003
Schick Dry Shaver	A 109a
Smith's English Clocks, Ltd.	E 639
Steiner, I. & M., Ltd.	G 909
Synchrophone (1936) Co.	G 939
Synplas, Ltd.	F 844
Thermega, Ltd.	A 119
Tintometer, Ltd.	A 79
Twentieth Century Electrical	A 793
Vactric, Ltd.	H1008
Vulcanised Fibre, Ltd	F 708
Waite & Son, Ltd.	F 770
Walker Fender Co., Ltd.	White City 1918
Webb, T., & Sons	D 522
Wedekind & Co.	K 1339a
Woodfyt Sales, Ltd.	White City 1714
Wright & Weaire, Ltd.	A 81

The Birmingham Exhibits

Accles & Pollock, Ltd. (D. 812/915)
Tubular products will be shown, from 0.217 mm. to 5 in. outside diameter. Considerable developments have been made in stainless steel tube production, and the company is also making mechanical and precision tubes from monel metal, aluminium alloy and cupro-nickel. A pylon exhibit and samples of sections and fabricated parts are other items of interest.

Aeraspray Mfg. Co., Ltd. (D. 290)
New spray guns embody pre-selective fan control, enabling the operator to change from fan to round spray and *vice versa* without ceasing work. Automatic spray guns include an electrically operated model, while single and two-stage receiver-mounted compressor sets (illus.) are obtainable in a wide range of sizes with either automatic stop-start or constant speed governor control. Fans, spray-booths, pressure feed lacquer and tanks are other items shown.



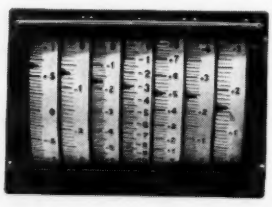
Aeraspray two-stage compressor

Aerostyle, Ltd. (B. 908)
Spray painting and finishing equipment, both stationary (illus. page 235) and portable, will include new and improved models in spray guns, paint containers and compressor sets. Portable plants will be on view, ranging from ¼ h.p. to full capacity 2-gun sets.

Alkium Storage Batteries, Ltd. (Cb. 309)
Among hand lamps and portable lighting sets will be a new high-power hand lamp for use by fire brigades, etc. Applications of the Alkium nickel cadmium alkaline batteries are switch tripping, solenoid operation, bus lighting and starting, commercial vehicle starting, trolley-bus lighting and manœuvring, yacht lighting, etc. Nickel iron tubular positive plate batteries are available for use on trucks, road vehicles, and for all traction purposes. An emergency lighting equipment will comprise a battery together with a Partridge Wilson "Davenset" rectifier.

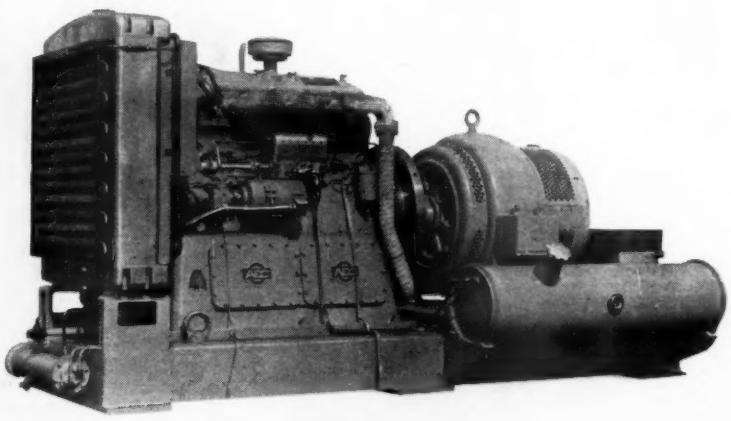
Edgar Allen & Co., Ltd. (D. 730/831)
A range of "Stag Allenite" tungsten carbide-tipped cutting tools will be shown for the first time, together with "Stag Major Superweld" tools, which are supplied in over 300 standard shapes and sections.
In addition there will be a display of a varied range of press tools, screwing tackle, etc., made from Edgar Allen "K-9" and "Double-Six" die steels; tools of these types are being lent for display by several important press tool makers and users. Pneumatic chisels and punches made from "Minerva" steel will be shown.

Allen West & Co., Ltd. (D. 206)
Boiler meters for recording steam and air flow, fluid meters, indicators and recorders for pressure and temperature, draught gauges, gas flow meters, water-level recorders and feed regulators, pump and combustion controls will be well represented, and a kiosk type panel board will show a number of them mounted. The company specialises in automatic combustion controls, steel works controls, and meters for the measurement of gas, air and special fluids.



Allen West multipoint edgewise draught gauge

Arrow Electric Switches, Ltd. (Cb. 711)
Many new switches and accessories have been added to this company's wide range. Pilot light control units of a variety of types are all of attractive modern design, neatness and compactness, while cooker control units, water heater and wash-boiler units, together with individual pilot light or semaphore control, are offered in sizes from 5 to 30 A, with rotary or tumbler switch control arranged for flush or surface mounting. Magnetic contactor motor starting switches with remote control push-button stations will also be featured.
"Wilcolator" thermostats, with and without pilot lights for electric cookers and water heaters will be displayed. A new slow make-and-break cooker switch shown for the first time is interchangeable with existing quick make-and-break types and considerably smaller. Many new and improved small domestic appliance switches for controlling fractional h.p. motors are available, as well as a complete range of rotary switches for flush and surface mounting.



An A.E.C. transportable oil-engined, self-contained 60-kW generating set for industrial purposes

Associated Equipment Co., Ltd. (D. 820)
A transportable oil-engined generating set for industrial purposes (illus.) is entirely self-contained. With the exception of the fuel tank, which is fitted inside, the radiator, starting equipment, etc., are all mounted upon the baseplate. Because of its high speed it has been possible to construct this set to give a full 60 kW at the low weight of 3¼ tons in working order. The power unit is a standard 115 mm. by 142 mm. six-cylinder oil engine, having a continuous rated output of 100 b.h.p. at 1,650 r.p.m. Owing to the fitting of centrifugally cast lead-bronze bearings it is possible to start the engine from cold and subject it to full load in less than one minute.
In the marine field there will be shown, in addition to a six-cylinder oil engine for propulsion developing 100 b.h.p. at 1,650 r.p.m., a similar four-cylinder 28-kW ship's auxiliary oil-engined generating set.

W. & T. Avery, Ltd. (D. 512/613)
The principal exhibits on this stand will be a new heavy capacity weight-indicating and recording machine; a dust-proof industrial visible weigher for sack filling; a machine for counting bobbins, spools, etc.; a large automatic grain weigher; self-indicating universal and hardness testing machines; and Avery-Hardoll petrol pumps with pre-setting devices.

Babcock & Wilcox, Ltd. (D. 400/501)
This stand will be prepared in conjunction with the company's subsidiary companies: the Stirling Boiler Co., Ltd.; Edwin Danks & Co. (Oldbury), Ltd.; Clarkson Thimble Tube Boiler Co., Ltd.; Calorizing Corporation of Great Britain, Ltd.; and Spencer-Bonecourt, Ltd. In general the exhibits will show welding, principally as applied to the fabrication of piping and to the attachment of flanges, etc., to piping, steam receivers and other pressure vessels. Apart from representative test plates, radiographs, etc., demonstrating the tests carried out with Babcock "Class One" fusion welding process, the display will consist mainly of piping and valves.

Baldwins, Ltd. (Cb. 412)
Samples of steel sheets and made-up articles will demonstrate the use of steel for such purposes as dynamo and transformer work. Electrical steel stampings will include completed assemblies, finished laminations ready for assembly in stators and rotors, and various transformer types, also segmental stampings.

Barrett & Elers, Ltd. (A. 305)
A meter case and its component parts will form one of the principal exhibits of this company, which will be showing moulded bakelite articles of all kinds for use in the electrical and other trades.

Batteries, Ltd. (Cb. 913)
A special room is being fitted up to permit demonstrations of "Nife-Neverfayle" emergency lighting sets, an important component of which is the nickel cadmium alkaline battery, which has no open-circuit losses, and will stand idle for months without charging or main-

"Nife Neverfayle" selector (Batteries, Ltd.)

tenance. In the d.c. equipments demonstrated the power is supplied from a 110-V "Nife" battery of sufficient capacity to last out the Fair on a single charge.

Considerable savings in the cost of emergency lighting installations are made possible by the introduction of the "Selector," which consists of a special contactor provided with two control buttons (illus.). When the main supply fails all the emergency lights are automatically illuminated, but by operating the push buttons unwanted emergency lights can be extinguished or switched on again at will. When the main supply comes on again the "Selector" automatically resets itself to the full emergency position. Frequently it is found possible to reduce the size of the battery required by more than half.

Among the "Nife" nickel cadmium alkaline cells shown will be types suitable for yachts, telephones, electric trucks, switch tripping and closing, electric clocks, emergency lighting and steering in ships, Diesel engine starting, aeroplane lighting and starting, and watchman's hand lamps. In addition, an installation of miners' lamps will comprise "Nife" high candle-power electric hand lamps incorporating nickel cadmium alkaline accumulators, and also the latest pattern high candle-power cap lamp with the same type of battery. A charging rack to accommodate fifty lamps and various accessories will also be included.

Beetle Products Co., Ltd. (Cb. 305)

"Beetle" and "Scarab" moulding powders and mouldings made therefrom in white and colours, together with synthetic resins for lacquers, will form this company's exhibit.

Belling & Co., Ltd. (Cb. 413)

Practically all the company's extensive range of fires will be on view, from the low-priced "Dinkie" to the imposing new "Grosvenor" and "Majestic" models. A special feature will be made of inset and panel fires, examples to be shown including the popular "142" in the well-known "Neutone" finish and the "168" wall panel in black and chromium. The self-ventilating construction of these fires enables them to be fixed straight to the walls without risk of scorching.

Double armourplate glass oven doors and "Temset" oven control will render the 43 GD and 44 GD de luxe models of particular interest. They have replaceable grill-boilers fitted with knife blade and spring clip connectors. There will also be a comprehensive display of standard model cookers, including the 42, 43 and 44 (illus. page 237) and the "Baby Belling."

Belling & Lee, Ltd. (Cb. 724)

A large electro-mechanical display will demonstrate the effect of various appliances before and after radio interference suppression by approved methods. The results may be heard on a radio receiver and seen on a cathode ray oscillograph. A model will also show the all-wave anti-interference aerial, "Eliminoise," which operates on the transmission line principle.

Among items not exhibited before will be the set lead suppressor, type 300, and a three-core flex lead suppressor, type 301, both of which incorporate filters in the earth leads. The advent of television has resulted in the development of some interesting di-pole aerial systems. As a further development of these an h.f. low-impedance feeder cable has a surge impedance of only 72 ohms. There is also a new range of insulators, including a "T" strain insulator, specially designed for the centre of di-pole aerials, etc. A full range of single, double and treble choke and condenser filters, and suppressors for lifts, neon and flashing signs will complete the display.

B.E.N. Patents, Ltd. (B. 736/825)

A range of fixed, portable and automatic air compressors for industrial uses will include models specially adapted for tyre inflation (illustrated), pressure greasing, spray painting, etc., for the motor trade, other garage equipment on view being a two-gun high-pressure car washer, flexible shaft sanding and polishing machines, power grease guns and hydraulic jacks.

A selection of spray-painting equipment will comprise fixed and portable spraying machines, spray guns, paint containers, and other accessories.

Berry's Electric, Ltd. (Cb. 307)

This company's exhibit will consist mainly of "Magicoal" fires, water heaters, lighting fittings and switchgear. Several new lighting fittings of both modern and period character are being introduced, and a new type of water heater incorporating a number of novel features will be seen.

Bi-Metals (Cb. 811)

Demonstrations of soldering with "Britinol" products will be given and visitors will be invited to submit their own soldering problems. Electric signal timing clocks, thermostats, engineers' small tools, scientific instruments, etc., will also be exhibited.

Bingham Appliances, Ltd. (Cb. 726/827)

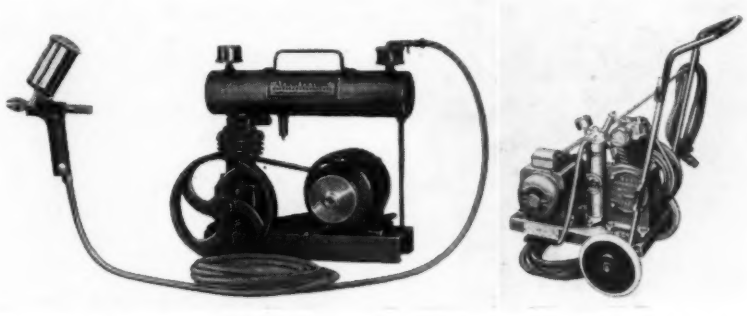
With the "Super" poultry plucking machine shown it is possible to pluck and stub 30-35 birds an hour, without risk of bruising or tearing, for a consumption of only ¼ kWh of electricity. Feathers are hygienically collected direct into a sack. The "Precision" egg-grading machine will deal with 7,200 eggs per hour. It is hoped that a new mixing machine for preparing mash for poultry and pigs will be ready in time for exhibition.

Birkbys, Ltd. (Cb. 411)

Apart from "Elo" moulding powders of the phenol formaldehyde type in a wide range of colours, synthetic cements, resins and varnishes, there will be a selection of completed mouldings which have been made for the electrical accessory trade, etc., such as plug and socket parts, fuse mouldings, switch parts, telephones, and meter cases.

Birmingham Electric Furnaces, Ltd. (Cb. 320)

This stand will again be arranged mainly as a technical information bureau on electric furnace practice. Photographs will show "Birlec" installations of every type, and various furnaces (illus.) will be represented by scale models, the full-size equipment being too large for exhibition. A special type of internally heated salt bath, with removable elements, for the heat-treatment of aluminium alloys and improved design in the well-known "Birlec-Detroit" rocking, indirect arc melting furnace will be featured, while many of the smaller furnaces will be in actual operation at the company's demonstration department about a mile from the Fair, where facilities will be provided for practical tests on bright annealing, scale-free hardening and general heat-treatment and melting work. Typical products from "Birlec" heat-treatment and melting furnaces will also be exhibited.



Aerostyle "Aerolectric" spray-paint outfit and the B.E.N. "Pneu-Flator" for car tyre inflation

"Birlec" 120-kW driven roller hearth furnace for continuous bright normalising of steel strips and sheets

Birmingham Electric Supply Department (Cb. 506)

An inquiry bureau will give full particulars of the electrical facilities in Birmingham and of the tariffs in operation. Information will also be available of the progress made by the Department, and of various applications of electrical energy in the area of supply, illustrated in many cases by photographs, diagrams, etc.

Black & Decker, Ltd. (Cb. 923)

Electric drills from $\frac{3}{16}$-in. to 1-in. capacity in steel will include the "Junior" drills and models for inter-

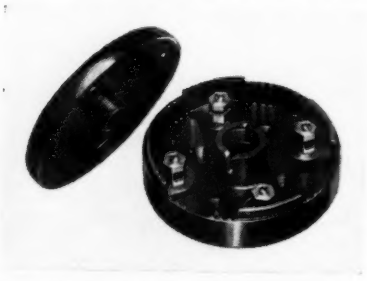
Black & Decker "Utility" drill

mittent service or heavy duty work. Recent additions are the ¼-in. "Aero" special drill, designed primarily for aircraft work, which can be fitted with a right-angle drilling attachment, and also the ⅜-in. "Utility" drill (illus.), a powerful, compact and light machine for maintenance work and intermittent drilling.

Other products shown will be portable electric screw-drivers, a portable electric tapper, light and heavy duty sanders, a 6-in. portable electric grinder, standard and automatic portable electric vitrifiers, bench grinders, and the new transportable "Valve Shop."

S. O. Bowker, Ltd. (Cb. 417)

A new design of cast-iron trough conduit boxes for use with "Tenbyluxe" accessories eliminates brickwork excavation except for a small channel to accommodate the trough and the easily wired



"Tenby C.T.2" bakelite junction box (S. O. Bowker)

back inlet. The accessory is fitted to an easily detachable grid which enables the box to be mounted either vertically or horizontally. A pressed steel box, applicable to skeleton house work, is now available for oval conduit.

"Snap-on" fixing is provided for the covers of a comprehensive range of "Tenby" junction boxes, which include round and bonding wire models. A feature of the "CT2" brown bakelite junction box (illus.), which is 3 in. in diameter, is that a knock-out in the centre of the lid enables it to be used as a ceiling rose. It has a central screwed collar on the base into which the hollow boss on the lid is screwed, and the terminals are horizontally slotted for easy wiring. The similar "CT3" box is 2¼ in. in diameter. As in all "Tenby" accessories, the ceiling roses are designed particularly for speedy wiring.

Switch plates, both flush and surface types, will be seen in a variety of neat and attractive patterns, together with complete switches and switch-sockets for all purposes, buckle clips, saddles, bonding bars, porcelain conectors, wood channelling and channelling clips, etc.

Geo. Bray & Co., Ltd. (Cb. 405)

A wide range of electric heaters and refractory insulators will include heaters for industrial, traction, marine and domestic use. A new loop-rod type of element suitable for many immersion heater applications will be shown and in some of the designs a novel safety cut-out is incorporated. There will also be numerous boiling plates, immersion heaters, strip and ring elements, oil preheaters, radiators, etc., as well as refractory firebars, plain and screwed tubes, rods, etc.

Brightside Plating Co., Ltd. (Cb. 909)

A magnetic chromium-plating plant (illus.) designed to eliminate wiring and unwiring in chromium plating, will be the principal exhibit. Articles, instead of being wired, are, if ferrous, held by magnetism on a disc-shaped conveyor, which is itself an electrically energised magnet with its poles mushroomed out into discs. Other exhibits include filtering systems for plating solutions and Westinghouse metal rectifiers for plating purposes.

Britannia Batteries, Ltd. (Cb. 603)

Stationary batteries of all sizes (illus.) will include types with lead-lined wood boxes and double-glass boxes and cells in section showing constructional details.

Among traction and marine types the lead acid battery has tubular positive plates containing a special long life capacity-retaining material; the negative plates have "rippled" surfaces, providing freer and better acid circulation. They are particularly suited for marine use since the extra acid space above the plates allows for the heeling of the ship, and the extra space below for sediment.

Starting and lighting batteries, including the "Pertrix Extra," which has a two years' guarantee, are available to fit almost every type of car and there are special designs with tubular positive plates for buses and heavy commercial vehicles and for Diesel engines with their peculiar starting conditions. Similar tubular-type batteries are now used largely for sound-film operation in cinemas.

An eight-years' guarantee is carried by certain types of alkaline batteries, which will hold their charge for long periods, are practically indestructible and are claimed to be the only ones with tubular positive plates made entirely in England. Models will be shown for electric vehicles and trucks, ships, train-lighting, bus and coach lighting, stand-by use, and miners' lamps. Nickel-iron and nickel-cadmium types each have their own special characteristics.

The "Pertrix" dry batteries for radio, flashlamps, etc., have a non-corrosive electrolyte which conserves the zinc electrodes when not in use. Among the radio accumulators shown will be unsplashable types for portable receivers.

Britannia Electric Lamp Works (1934), Ltd. (Cb. 315)

A full range of electric lamps will comprise all types of domestic, sign, automobile, traction, decoration and coloured types. Items of special interest are night lights for hospitals, etc., and the "Excelsior" lamp which is claimed to give 80 per cent. more concentrated light than a coiled-coil model.

Britannia Tube Co., Ltd. (D. 422/521)

For the first time will be shown stainless-steel tubes welded by the atomic hydrogen process which is claimed to give perfect penetration. They are available in all sizes up to 2 in. outside diameter. Other exhibits will include mild-steel and stainless-steel tubes in close joint, open joint and welded qualities, bent and straight; mild-steel tubes cased with brass, aluminium and stainless steel; angles, channels and sections in mild steel and stainless steel; and seamless aluminium tubes.

British Aluminium Co., Ltd. (D. 808/911)

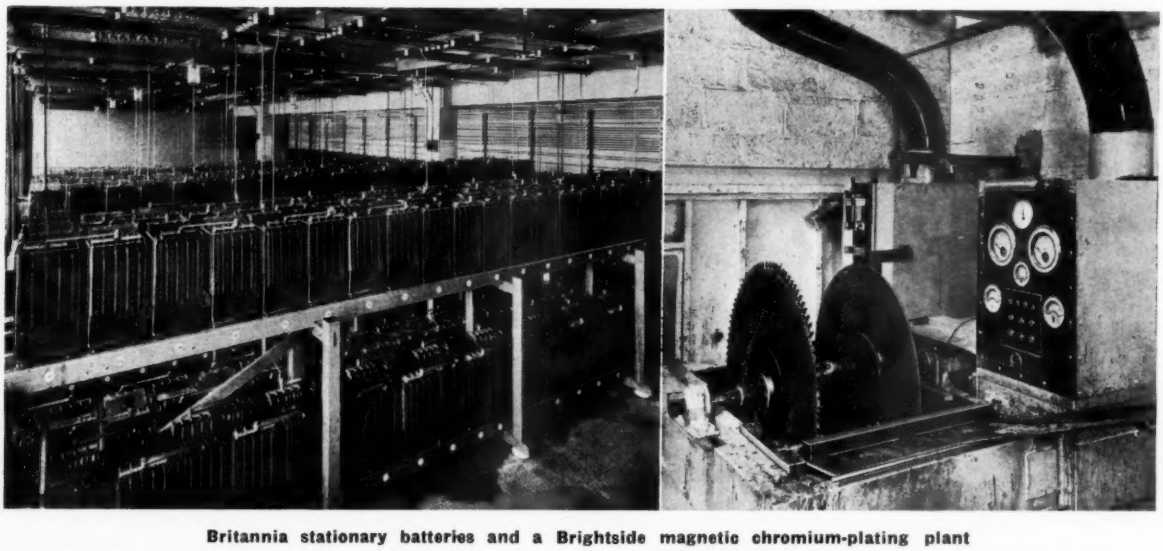
In addition to the ordinary applications of aluminium and its alloys, recent and interesting developments in its use for commercial, domestic and artistic purposes are demonstrated, in particular the "Brytal" reflector process, which combines the advantages of anodic treatment with an actual increase of reflectivity as compared with polished aluminium. "Brytal" treated aluminium shows a reflectivity for light of 85 per cent. compared with 100 per cent. for standard silvered glass, 96 per cent. for silver plate and 70 per cent. for nickel plate, and it is also superior for heat reflection, the special surface employed being unaffected by temperature. The overhead lighting of the stand has been carried out by Benjamin fittings with aluminium reflectors.

Examples of forged duralumin pressure and gravity die castings, extruded sections in the standard alloys coated with pure aluminium, the "BA/35" free-cutting alloy, and anodising are also shown.

British Electric Domestic Appliances, Ltd. (Cb. 318)

Totally enclosed gears running in oil, rubber mounting for the motor, self-oiling bearings, a porcelain enamel double tub, extra large soft rubber wringer-rollers, and a streamline wringer control are features of the "Model M Bedal Astoria" electric washing machine (illus. page 245). Model "B" is similar and, although not incorporating all the refinements of the more expensive model, is stoutly constructed and well finished.

Thermostatic control is provided in the "Bedal Aerofrige" refrigerators, which are obtainable in 5.3 cu. ft. (No. 1) and 3.5 cu. ft. (No. 3) sizes. They are silent and will not interfere with radio reception. This may also be said of the "Mary Ann" and the "Bedalux" vacuum cleaners, which, in spite of their moderate prices, are supplied complete with a full kit of up-to-date accessories.



Britannia stationary batteries and a Brightside magnetic chromium-plating plant

British Electrical Development Association (Cb. 406/507)

The design of this stand represents a radical departure from the practice of previous years. The main features are the four tall towers, ringed in blue neon strips and linked by facades, which display a series of typical E.D.A. posters illuminated by concealed lighting. The stand will occupy its usual prominent position in the centre of the Electrical Section, and will comprise a central lounge, with cloakroom accommodation and an office.

British Industrial Plastics, Ltd. (Cb. 204)

Specimens of moulds, dies and hobs for the plastics industry will be shown.

British Oxygen Co., Ltd. (D. 324 & 410/511)

A complete and representative range of products, including regulators, blowpipes, cutters and other accessories, will be exhibited and demonstrated. A 20-in. multi-head oxygen cutting-machine will be shown in operation as well as joist, straight line, and 55-in. oxygen cutting-machines, while a feature is to be made of welding pipes by the Linde process especially as applied to the butt welding of large pipes.

Equipment and materials for arc-welding and metal spraying are being exhibited and demonstrated on Stand D.324. The arc-welding equipment for both portable and stationary use will include a single-operator a.c./d.c. motor generator having a current range of 15-150 A, and a double-operator set with regulators to give a current range of 60-220 A per operator. These machines are of unit construction, having a combined frame for both motor and generator—so minimising the floor space required. In a single-operator portable transformer of the oil-cooled type, also shown, the current regulating switch is operated by handwheel on top of the tank and gives a range of 30-250 A in 24 steps. Another interesting transformer equipment is a three-operator, 3-phase oil-cooled transformer, together with regulators to give a current range of 35-300 A per operator. "Ferro-Arc" electrodes suitable for practically all requirements of the engineering trades are demonstrated.

British Rema Manufacturing Co., Ltd. (D. 804)

Most of a comprehensive range of crushing, pulverising, classifying and mixing plant will be shown in operation. Many machines incorporating new features will be seen for the first time, and will include a ring roll mill, a multiplex pulverised-fuel firing unit, an air separator, disintegrators, pneumatic driers, a rotary vibratory screen and centrifugal clutches. The company undertakes the design, construction and erection of installations for producing powdered and granulated material.

British Sangamo Co., Ltd. (Cb. 502)

The new "S.S." synchronous switch of the plug-in type (illus. page 251), although small, fulfils the requirements of a wide range of switching applications. It has single-pole, single-throw silver contacts and has a rating of 10 A at 250 A maximum, though it can be supplied for lower commercial voltages on frequency controlled circuits. Its features include bakelite housing and plug-in mounting, interchangeable day and solar dials, a day omitting device, an external manual operation system and the safeguard of an all-enclosed mechanism. The switch has one "on" and one "off" lever, but additional levers up to three "on" and three "off" may be provided when the day omitting device is not required. The switch may be set for minimum periods of twenty minutes between operations, and will plug into any standard street lighting post box. The bakelite base supplied also forms the plug receptacle and thus eliminates the necessity for a separate terminal block. All live parts are completely enclosed, and the motor circuit is fused on both sides. An earthing terminal is included and provision has been made for external padlocking or sealing.

In addition, a full range of electricity meters is being exhibited, including prepayment meters and fixed charge collectors. These are available for single, dual or triple coin, single-slot operation. Interesting new applications of this type of mechanism being shown include the type R.C. rent collector and the type B.E. collector. Other exhibits consist of a.c. single-phase and polyphase watt-hour meters; temperature compensated portable test meters, embodying six self-contained current ranges and two self-contained voltage ranges; test blocks; maximum demand attachments; current transformers; ampere-hour meters; synchronous motors and clock movements; and a range of the well-known Weston electrical instruments.

British Thermostat Co., Ltd. (Cb. 909)

Representative examples of automatic control equipment for space heating, refrigeration, air-conditioning and industrial heating installations will include thermostats, humidistats, pressure-stats, expansion valves, float valves, magnetic and motorised valves, relays and contactor gear, complete control panels, and numerous smaller components, such as bellows gland type shut-off valves, and refrigeration accessories.

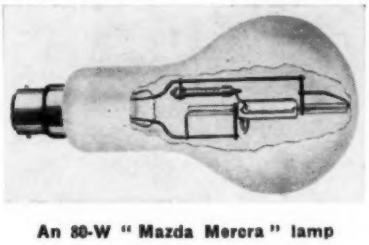
Shown for the first time are "Teddington" hydraulically operated motorised valves (illus. page 242) for controlling the flow of steam, water, refrigerants, liquid or gaseous fuel, and the like under thermostatic control. In these units the thermostatic switch or other automatic switching device controls a small electric motor driving an oil pump, which transfers oil from a reservoir to a bellows chamber, thus setting up hydraulic pressure which operates the valve through the bellows mechanism against the pressure of a spring. Similar units are available for operating dampers, small doors or louvres. These valves and damper units are available either with simple on-off action or with special automatic features giving "inching" operation.

The new "Teddington" room thermostat, type "RT," is of the bi-metal type, so designed that the sensitive element is well isolated from the walls of the room, thus ensuring that it is exposed to air representing the mean temperature. It is housed in a bakelite case.

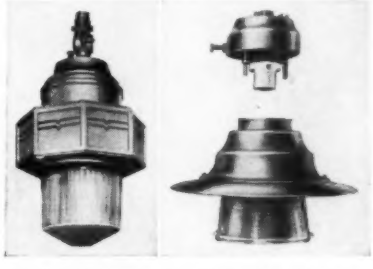
Three of the latest cookers: the Belling "44," Moffat "22" and Carron "F.2"

British Thomson-Houston Co., Ltd. (Cb. 504/607)

The colour scheme of this year's stand, which is mainly light and dark blue, is enriched by illumination from coloured and white "Mazda" light tubes, and the new alphabetical series of light tubes which are employed for the facia lettering. Besides the wide domestic range of standard "Mazda" vacuum and gas-filled lamps, a full array of equipment for street lighting, industrial lighting and floodlighting will be shown, including the "Diron," "Ranger" and "Crown" street lighting lanterns.



An 80-W "Mazda Mercra" lamp



G.E.C. "Difractor" and B.T.H. "County Junior" lanterns

Three new lanterns with high efficiency yet low maintenance, are the "Dilen," "Diref" and the "County Junior." The "Dilen" finds extensive application in lighting roads converted to trolley bus working, while "Diref" is suited to the outskirts of towns or to rural districts. The "County Junior" (illus.) is intended for side street lighting with low-wattage lamps, and is specially designed for use with the new 80- and 125-W extra high-pressure "Mazda Mercra" electric-discharge lamps (illus.) which will be a prominent feature of the company's comprehensive lamp exhibit.

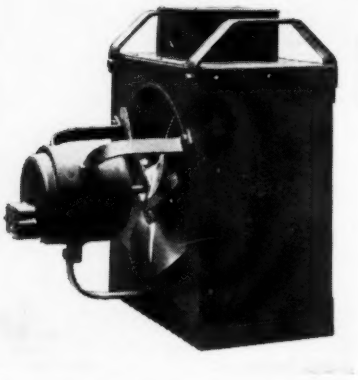
These new "Mazda Mercra" lamps, which form an extension of a range previously including only 400-, 250- and 150-W lamps, resemble 150- or 200-W standard gasfilled bulbs in general shape and appearance. To secure high efficiency, compact size, and good lumen maintenance, the operating mercury-vapour pressure has been increased to a value much higher than that hitherto used. The lamps can be run in any position and are fitted with special three-pin bayonet caps. The initial lumens of the lamps are: 80 W, 3,040 lumens; 125 W, 5,000 lumens.

An addition to "Mazdalux" floodlight projectors is a new and inexpensive model, the "Mazdalux Eight," which has been introduced to meet the demand for a general-purpose projector to take 150-300-W lamps. For the Coronation a variety of artistic and colourful illuminated devices is available, generally utilising concealed lamps and a weather-resisting composition for the mouldings. An alphabetical series of light tubes in 20 in. and 12 in. letters is now produced in white and coloured opal finish, and is ideal for facia lighting. Also shown are projector lamps for airport and aeroplane lighting and for cinemas, film studios and for sound reproduction and recording. A new handlamp transformer is demonstrated, as well as sunlamp equipment and accessories.

British Trane Co., Ltd. (B. 418)

On this stand will be working models of "Vectairs" operated by low-pressure steam, hot water and electricity. A self-contained unit will show the models in actual operation with temperatures of inlet and outlet air at given steam pressure and water temperature. The steam pressure, flow and return hot-water temperatures also the air temperature both entering and leaving the heaters will be clearly indicated, so that exact performances of "Vectairs" can be visually proved. A wide range of electric models, both thermostatic and non-thermostatic and including a glow light, will be displayed, together with "Univectairs" (illus. page 238) for factories, garages, etc.

A new combined heating and cooling floor-type cabinet shown has a fan capacity of 300 c.f.m., the twin centrifugal runners being belt-driven by a small electric motor. These cabinets will be available either with hot water, steam or electric heating elements, and the cooling coil can be made for water, brine or direct expansion refrigeration. The



An electric "Univectair" (British Trane Co.)

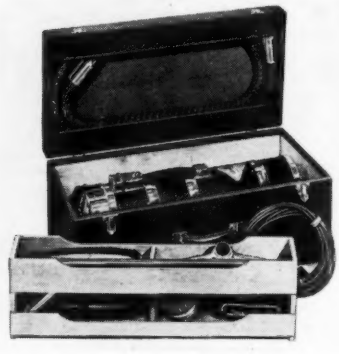
model will be fitted with an electric heating element and D.E. coil, both of which will be of the "Vectair" finned-tube construction.

British Vacuum Cleaner & Engineering Co., Ltd. (Cb. 309)

A comprehensive range of domestic cleaners will comprise both cylindrical and bag types. Among the former the latest model, "Goblin Ace" (illus.), has a novel swivel hose coupling, hygienic dust bag, three-way agitator nozzle, and a storage case. The popular "Goblin Triumph" will also be conspicuous. A new "Wizard" bag model incorporates several improvements.

Industrial-type cleaners will include the portable "T.6" one-operator machine and the belt-driven "T.O.6" fixed plant for cinemas, theatres, &c. A similar fixed plant, the "B.O.13," is direct coupled and runs at a lower speed. Information regarding flue-cleaning plant, &c., will also be available.

The company is also introducing a low-



The "Goblin Ace" cleaner

priced washing machine. This was described in our last week's issue, page 209.

Briton Lamps, Ltd. (Cb. 924)

A 100-W "Britrae" gaseous discharge lamp has been added to this company's comprehensive range of lamps, which includes all domestic types as well as daylight, rough service, traction, "Dimlite," "Photolite," colour sprayed, candle, architectural, pigmy and automobile lamps. Lampholders for architectural and strip lamps will also be on view.

Bromak Pneumatic Paint Brush, Ltd. (Cb. 708/809)

Demonstrations will be given of brush painting by power.

Bulpitt & Sons, Ltd. (Cb. 510)

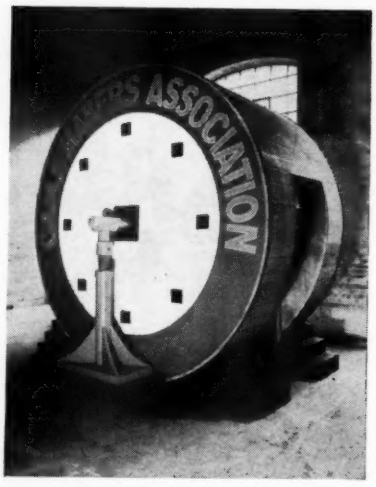
An improved handle and a permanently fixed flex are features of a new iron, while a new 10-gal. washing machine has a 3-kW immersion-type element, an automatic safety device, two switches giving three-heat control, a flat wooden top and a wringer. The "Speedee" wash-boilers have immersion-type elements, automatic safety devices, two switches and are available in various finishes. Two other new items are a coffee percolator set and a breakfast set, a novel feature of which is that the toast rack can be mounted in slots on top of the toaster. Examples of other table and cooking appliances, fires, wash-boilers and ground-base utensils for cookers will also figure prominently.

Burco, Ltd. (Cb. 415)

The "Coronation" electrically heated washing cabinet (illus. page 245) will be this year's attraction. Finished in mottled grey porcelain enamel with an aluminium-top hinged lid and agitator, the machine is of pleasing appearance and sturdy construction. It has a 10-gal. capacity and a loading of 3.5 kW, three-heat control and an automatic safety cut-off being provided. A complete range of the company's already well-known previous models will also be displayed.

Cable Makers' Association (Cb. 400/501)

A joint exhibit prepared by the members of the Association will be repre-



The C.M.A. inquiry office

sentative of cables and accessories used in electric light, power and telephone installations, and will include super voltage cables insulated with paper for working pressures up to 66,000 V; mains cables for use underground, insulated with paper, cambric or bitumen, with different styles of armouring and protection; rubber-insulated cables with various metallic and non-metallic protective coverings in single and multi-core types; special house-wiring systems both in conduit and protected surface wiring systems; tough rubber-sheathed trailing cables for mining and other purposes; flexible cords in twin and 3-core with various finishes; air-spaced dry-core telephone cables for use underground; loading coils, feeder pillars, straight joint boxes and tee boxes. The inquiry office will be in the form of a cable drum (illus.).

W. Canning & Co., Ltd. (Cb. 317)

An electro-plating vat will show the latest method of filtration of the solution, while the "Quickplate" plating barrel (illus. page 242) will include a motor for operating the wind-over gear from plating bath to swill. An electrically heated motor-driven sawdust barrel is available for quickly drying-out small articles after electro-plating, bright dipping or wet barrel burnishing, and there are two models of motor-driven electrically heated centrifugal driers for dealing with small articles after plating, &c.; sawdust is not used in the latter types, the time taken for drying being correspondingly reduced. Other electro-plating exhibits will be motor generators, dynamos, resistance boards, cable and immersion-type heaters for plating solutions, plating racks and materials for electro-plating.

Among metal finishing equipment a machine is exhibited which automatically polishes hub cap covers, lids and articles of similar shapes. Two centreless polishing machines are manufactured to deal with small tubes and a large variety of circular profile articles, and an automatic polishing attachment worked in conjunction with a polishing lathe is suitable for making lighting fittings, &c. Polishing lathes and polishing and finishing materials will also be displayed.

Carron Company (Cb. 304)

The "F" series cookers (illus. page 237) combine the minimum overall size with the maximum cooking capacity, and there is sample hob equipment for boiling and a roomy hot-cupboard for warming plates, &c. All elements are of the plug-in type, easily removable without tools, while the oven interior can be withdrawn in one piece for cleaning. Other cookers shown include the "Carronette," a model extensively used for hiring-out purposes.

Fires in various styles and finishes will also be on view, and among those of the portable type, in addition to the "Canterbury" and other established favourites, are the new "Study," "Screen," "Carroglo," "Pharaoh" and "Pedestal." Examples of dog grates with imitation coal fire effect, inset and outset fires, together with tubular heaters, breakfast cookers and irons, nickel-plated and in colour, will complete the display.

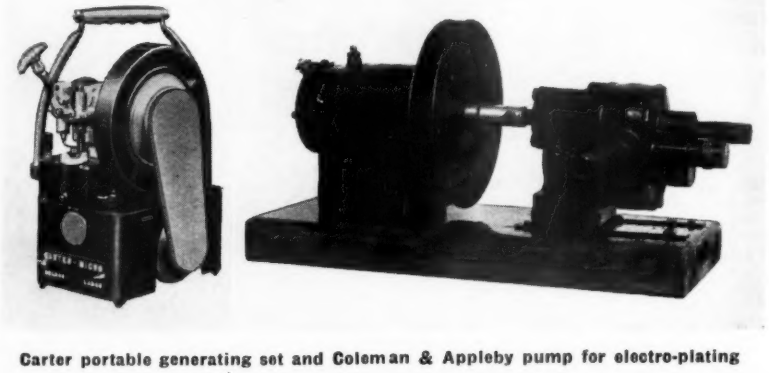
Carter & Co. (Nelson), Ltd. (Cb. 710)

A self-contained petrol-electric generating set (illus. below) has been designed to operate continuously in all climates with the minimum of attention. It weighs 68 lb. and has a steady output of 300 W at 10, 110 or 230 V. Suggested uses are emergency floodlighting, country cottage or yacht lighting, and the provision of current for agricultural implements, portable tools, &c.

This company has also developed a transformer for portable handlamps and a range of high-power vertical-type syrens for fire alarm systems, air-raid warnings, fog signals, &c. Searchlights and floodlights are made to meet the most exacting conditions.

Cellactite & British Uralite, Ltd. (Ca. 720/821)

"Urastone" incorrodible flue pipes and fittings will be shown in a great variety of pieces, including cowls, baffles, &c., and there will also be examples of the new "Urastone" which is lighter and will stand up to much higher temperature.



Carter portable generating set and Coleman & Appleby pump for electro-plating

Chloride Electrical Storage Co., Ltd. (Cb. 407)

In addition to displaying a comprehensive selection of batteries for all pur-

poses, this company will be demonstrating a typical "Keepalite" emergency lighting system, together with a floating battery cinema safety lighting system. Specially designed switch tripping batteries are arranged in a compact cupboard with trickle-charging and testing apparatus. Open-type, semi-closed and fully enclosed Chloride batteries for lighting and power supply, together with "Exide-Ironclad" batteries for vehicle propulsion, marine work, bus lighting, &c., form a representative range of products suitable for the heavy engineering trades.

Clang, Ltd. (Cb. 914)

New 5-A and 15-A, 3-pin plugs will make their first appearance on this stand, together with other bakelite electrical accessories, fittings, battery table lamps, gas-lighters, torches and bakelite mouldings.

Clear Hooters, Ltd. (Cb. 714/815)

Attention will be concentrated this year on three types of electrical car and motor cycle horn, the trumpet model

The Clear Hooter C.H.150 horn

C.H.150 (illus.), and the medallion models H.F. 180 and 500. An improved diaphragm gives superior tone, better performance and note-retaining qualities.

E. K. Cole, Ltd. (Cb. 926)

Much progress has been made in plastic mouldings during the last twelve months, and typical products indicate their growing uses in the electrical and allied trades.

Specimens taken from current orders from leading electrical concerns will comprise lamp-holders, junction boxes, meter cases, coloured radio cabinets, sealing chambers, power plugs, and sockets, fuse boxes, plug adaptors, tumbler switches, cut-outs and fuse-holders, h.f. suppressor tubes, transformer bobbins, knobs and switch handles. The company is prepared to undertake the moulding in large quantities of any suitable article and a designs advisory service is available.

Coleman & Appleby, Ltd. (Cb. 314)

Of particular interest in a complete working chromium-plating plant, will be a pump (illus. page 238) capable of dealing with any solution at the rate of 900 gals. per hour. Since the pump motor runs off the 6-V plating supply, it can be used in any plating shop whatever the mains supply is.

Concordia Electric Safety Lamp Co., Ltd. (Cb. 603)

This company, which is to share a stand with its associate, Britannia Bat-

Concordia "S.C.L." cap lamp

teries, Ltd., will show a selection of electric miners' and officials' lamps, including a new light-weight cap lamp (illus.). A charging stand, together with a Westinghouse metal rectifier charging unit and various types of photometers will also be featured.

Constructors, Ltd. (Cb. 608)

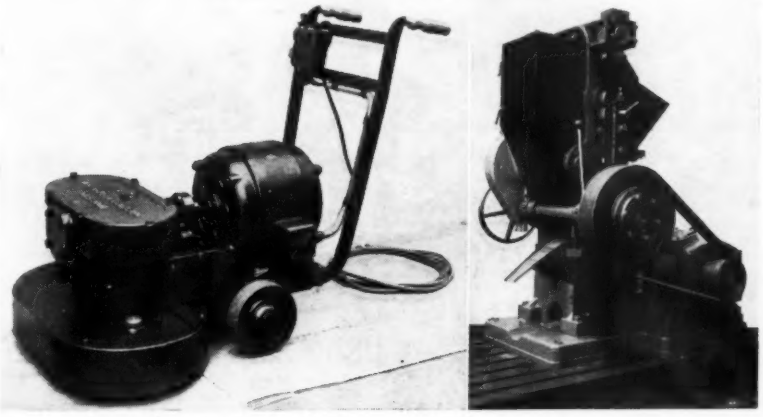
This company's slotted steel, besides providing a neat method of mounting switchgear, meter frames, &c. (illus. page 240), will be extensively used for the erection of Coronation displays. It is of unit construction and can quickly be erected from standard components, extensions being easily made. Steel lockers, work benches and tool stands, are other examples of the company's products, all of which are now treated with a new rust-resisting process.

W. Crockatt & Sons, Ltd. (B. 902)

Electrically driven floor polishers for terrazzo, etc., are available in two sizes—the "Major" (illus.), polishing a 2 ft. width of floor, and the "Minor" 10 in. They are fitted with double-disc polishing heads and are quiet in operation being fitted with ball bearings throughout. To avoid damage to floors the wheels of the "Simplex" 10 in. floor sander are rubber-covered.

T. H. & J. Daniels, Ltd. (Cb. 231)

Plastic moulding plant will include two sizes of preforming machines, both with self-contained motor drives, the smaller making tablets up to 1¼ in. in diameter and the larger up to 3 in. in diameter (illus.). Both can make tablets of irregular or ring shapes. A compact, self-contained 50/75-ton downstroke prefilling hydraulic press is fitted with electric platens and is operated by a patent automatic pump, which gives a two-pressure supply. A small pre-heating oven can be used for moulding materials in powder or tablet form, and



Crockatt "Simplex Major" electric polisher and the Daniels size 3 preforming machine

secures a great saving in curing time, with more uniform and better mouldings.

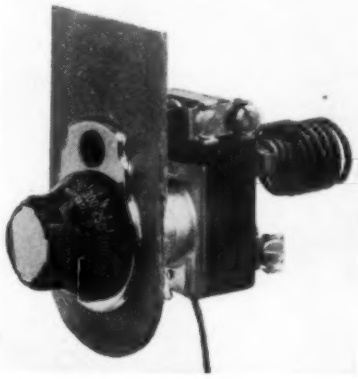
Desoutter Bros., Ltd. (Cb. 401)

In addition to standard 5/16-in and ¼-in. electric drill guns, weighing only 2½ and 2¾ lb. respectively, there are several variations, including type A.I., which is particularly useful to the aircraft industry for all straightforward drilling, duralumin and light alloys; type B.I., which weighs only 3 lb., and is designed for one hand operation; screw gun, type B.2, weighing only 3 lb.; and the corner drill gun, designed for drilling holes in corner positions and supplied in two models, 2,500 and 5,000 r.p.m. Type B.I. is also available with the low speed of 450 r.p.m.

A new high-power 6-in. electric portable grinder (illus.) embodies a former-wound armature, straight-through ventilation, ball bearings throughout, and helical gears. Apart from these tools, the company is showing its "Vidal" electric drills up to 1¼ in. in size, bench and pedestal grinders, drilling stands, pneumatic tools, and standardised die sets.

"Diamond H" Switches, Ltd. (Cb. 816)

Besides a full range of flush and sur-



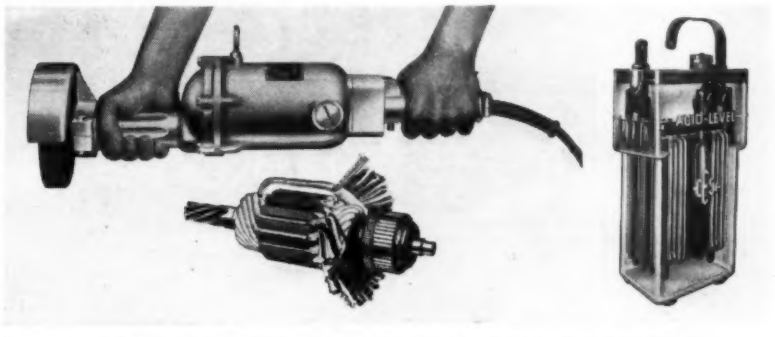
"Diamond H" hydraulic type thermostat

face-type rotary reciprocating switches from 3 to 40 A, there will be a special display of hydraulic oven temperature controllers (illus.), which are fitted to two cookers on view. Various makes of electric cookers fitted with "Diamond H" switches exclusively and some with "Diathermo" apparatus will also be shown.

A new type of cast-iron wash-boiler unit consists of an almost water-tight box, a new flush-mounting switch, and a special indicating device, comprising a stationary dial, rotating mask and black bakelite handle. The dial has the indications in white, the "On" or 3-heat indications being on a red background, and the "Off" on a black background. This method of indication is claimed to obviate the necessity for pilot lamps. The unit is provided with an earthing screw, and it can be supplied either with screwed or bushed entries.

Dominion Machinery Co., Ltd. (B. 423)

A wide range of electrically operated



Portable 6-in. Desoutter grinder and one of the latest Chloride batteries

woodworking machinery will include tenoning machines, "Super" and "Model Elliott" woodworkers, saw benches, band saws, dovetailers, sanding machines, cross-cut, mortising machines, and spindle moulders.

Donovan Electrical Co., Ltd. (Cb. 409)

The outstanding exhibit here will be an open type medium voltage feeder distribution panel (illus.) fitted with "Scrutact" 500-A high rupturing capacity cartridge fuseholders, features of which are: solid contact jaws and screw-expanded bridge contacts, easy insertion and removal of fuse bridges, high-contact pressure obtained by a few turns of an insulating knob on the bridge, and contact pressure maintained indefinitely by a self-locking feature. With this new construction connections to isolating links can be run straight out of the "Scrutact" contact jaws, thus eliminating joints in the copper work.

In addition a comprehensive range of heavy-duty ironclad switch and fuse gear and motor control gear will include a.c. contactors and power relays; a.c. push-button starters, direct-on, reversing and resistance type, of capacities up to 50 h.p.; resistance starters for single-phase repulsion motors, hand-operated and push-button controlled; two new large a.c. direct-on-line starters with interlocked switch and interlocked switch fuse respectively, each capable of handling 15 h.p. motors on standard voltage; d.c. push-button starters, direct-on, reversing, and multi-step resistance type, and a range of d.c. contactors up to 250 A capacity; control gear accessories; ironclad "Donlok" and "Safuse" switches; "Safuse" distribution boards; interlocked switch sockets and plugs; and "Solink" isolating links, including a low-priced new 15-A pattern.

Drew, Clark & Co. (A. 330)

Attention is particularly directed to a large-scale model of the "Council" pattern telescopic tower ladder which is now being supplied in large numbers to electricity undertakings and local authorities for the maintenance of street lighting.

Dubilier Condenser Co. (1925), Ltd. (Cb. 718/819)

Among many new items of interest to the electrical and radio industries are radio-interference suppressors for special industrial purposes, including trolley-buses; a range of oil-immersed dielectric condensers in oil-tight metal containers for television and other purposes where high efficiency and maximum insulation are necessary; disc, cup and tubular ceramic condensers, particularly suitable for ultra-short-wave radio receivers; and metallised mica dielectric condensers.

A number of improvements have been made to the company's power factor improvement condensers (illus. page 242), and a demonstration of the savings effected by their use will be given. A demonstration will also be given of automatic voltage regulators, the output of a shunt-wound d.c. generator controlled by the regulators being arranged to show the close voltage regulation possible under wide variations of load without manual attention. The exhibit will be completed by a full range of condensers for other industrial purposes, rheostats and mercury switch relays of all types.

Earle, Bourne & Co., Ltd. (D. 600)

A comprehensive range of the company's manufactures will include cold-rolled brass of various alloys, copper and aluminium alloy ("Sebalin" brand); brass sheets for electric fires; special brass for condenser vanes for the radio industry; solid drawn brass and copper tubes for condensers, engineering, refrigerators, etc.; brass and copper tubes, round, square, oval, flat, twisted, reeded and ornamental; drawn sections; and copper tubes for gas and electrical conduit purposes.

Electricars, Ltd. (Cb. 810/911)

Electric delivery vans will be represented by an 8-cwt. streamline model for electricity undertakings, etc.; 12-15- and 20-cwt. vans for bread delivery; a 20-cwt. local milk delivery vehicle; and a 20-cwt. chassis. In addition, a complete 10-12-cwt. van will be available outside the Fair for demonstration purposes. Among electric trucks will be a 5-7-cwt. three-wheeled fixed platform model (illus.), with small turning circle for working between gangways, and 10- and 30-cwt. four-wheeled standard fixed platform trucks for factory and workshop use.

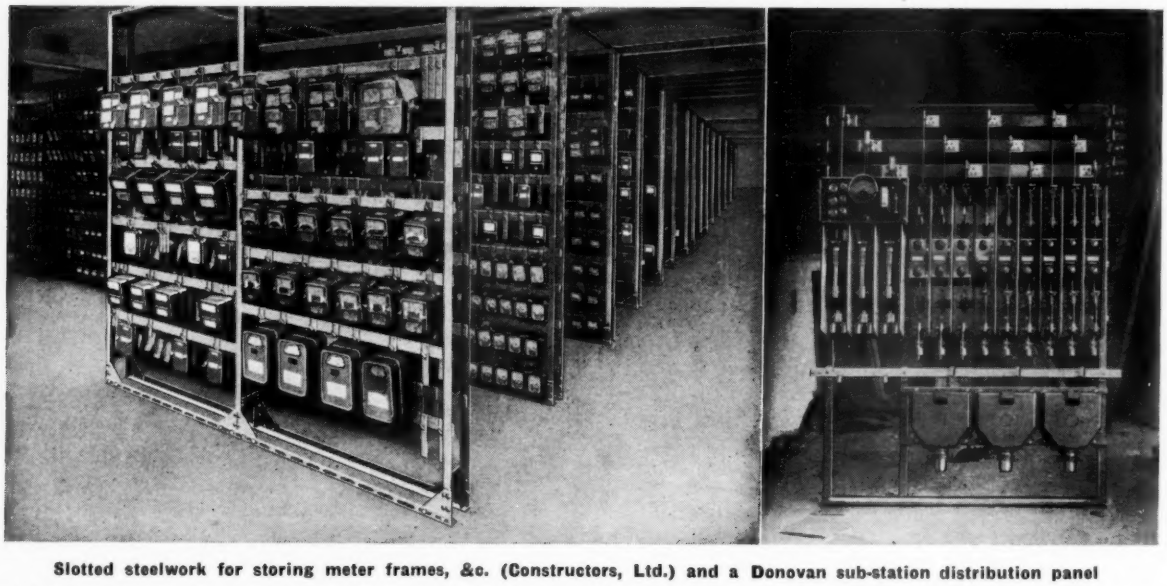
E. Elliott, Ltd. (Cb. 513)

This company will be showing, besides products of its own for sale in the export market, examples of bakelite mouldings which it makes for its various trade customers. A special feature will be made of the sockets of Astralite Electrical Products, Ltd., examples of whose plywood Coronation set-pieces will also be included. So great has been the recent increase in business that a third factory has just had to be opened at Bescot Crescent, Walsall.

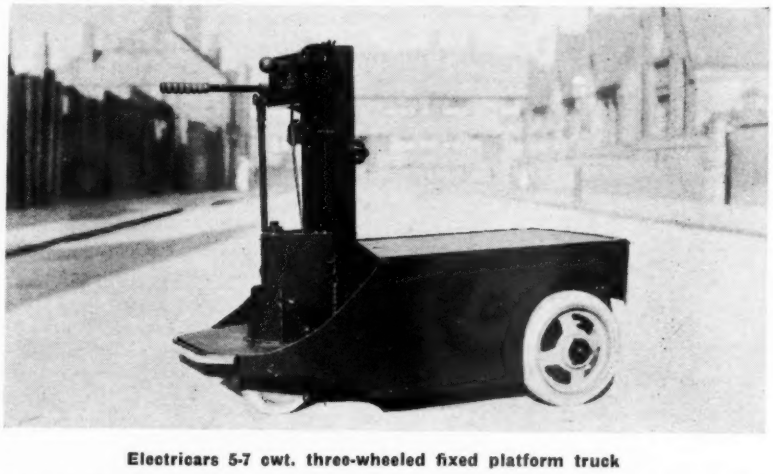
English Electric Co., Ltd. (Cb. 609)

Typical examples of the company's electric cookers will comprise the H.T.206A, H.C.209 and H.C.212 (illus. p. 246) models, the last-mentioned having thermostatic oven-heat control as an optional "extra"; also the breakfast cooker. There will be an interesting display of thermostatically controlled water heaters, which are manufactured in 1½-, 3-, 5-, 12-, 15- and 20-gall. sizes. One model is particularly suitable for hard water districts. Fires will include realistic "coal-effect" designs, portable, reflector inset and direct wall-mounting types. A special washing machine with transparent front and sides will demonstrate the actual effect of the agitator. The company's irons are streamlined and designed for easy operation.

A range of fuse gear for industrial and sub-station distribution incorporating the company's high rupturing capacity, non-deteriorating cartridge fuse, will include a "combination" fuse-switch board for factory distribution; a distribution system for factories employing individually driven machine tools; medium- and heavy-duty type distribution boards (illus. page 241) with simple and rapid cabling facilities and front indicating handles which permit the immediate localisation of blown fuses; U.35 distribution units for feeder pillar and sub-station use, having valuable space saving and cabling facilities; "Skeltag" link and fuse units for sub-station distribution; pole mounting, ground-operated fuse units for short circuit protection of



Slotted steelwork for storing meter frames, &c. (Constructors, Ltd.) and a Donovan sub-station distribution panel



Electricars 5-7 cwt. three-wheeled fixed platform truck

low-voltage and extra-high-voltage rural distribution networks; all-insulated porcelain fuse fittings with representative examples of low-voltage and high-voltage cartridge fuses and cut open, blown samples; and a range of "Zed" fuses and fittings.

Among a group of fractional h.p. motors is shown a burn-out protector, an example for use with a.c. motors up to 400 h.p.

Ether, Ltd. (Cb. 716/817)

Pyrometers and thermometers for the indication, measurement and control of low, medium and high temperatures, will comprise edgewise, round pattern and portable instruments, the prime mover being a sensitive moving-coil galvanometer which needs a power consumption of only 0.00000016 W to deflect the pointer across the full scale. The edgewise indicators are made with scales 5, 7 and 12in. in length, the scales being instantly adjustable so that the pointer position corresponds to the true air temperature. The round pattern indicator is suitable where quick readings of commercial accuracy are required, and it is supplied with a 5-in. scale. Portable indicators supplied with a 5- or 7-in. scale will withstand hard usage and maintain their accuracy.

The company's molten metal pyrometers can be used for indicating all non-ferrous molten metal temperatures, also low temperature cast iron, etc. A surface contact pyrometer for the surface temperatures of aluminium alloy billets, etc., when being forged or rolled, will also be shown, together with the "Indicorder" continuous chart recording and indicating pyrometer (illus.), automatic temperature controllers, optical pyrometers, a vapour pressure low-temperature indicator and thermo-couples.

Eversheds & Vignoles, Ltd. (Cb. 313)

Distant indication and control apparatus will include instruments for the remote control of electrical sub-stations, for the remote indication of gas flow, water flow, the position of valves, gas holders, water level in reservoirs, and apparatus for the automatic control of pumping plant. The "Noflote" system

Eversheds & Vignoles "Good Companion" testing set

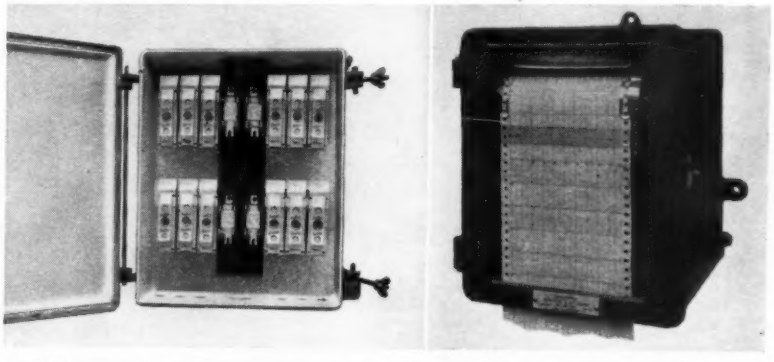
for drainage-pump control provides automatic control of electrically driven pumps without the use of floats or other moving parts in the drainage-sump. A special instrument is produced for indicating and recording the level of water in boreholes, etc.

Among instruments for the measurement of insulation resistance will be the "Megger" testing set, the "Meg" insulation tester, the "Bridge-Meg" testing set for the measurement of insulation and conductor resistances, the "Wee-Megger-Tester," which is claimed to be the smallest insulation tester in the world, the earth testers, capacity meters, and ohmmeters for the measurement of conductor resistances. The "Good Companions" testing kit (illus.), which includes a "Wee-Megger-Tester" and a "Megger" circuit-testing ohmmeter contained in a neat leather carrying case complete with testing spikes, leads and clips, is also exhibited.

Graphic recording instruments, electrical tachometers, "Dionic" water purity meters, and rudder indicators will also be featured.

Ferranti, Ltd. (Cb. 612/713)

Among many new items will be displayed an astatic voltage relay (illus.



English Electric six-way double-pole factory-type distribution board (60-A) and an Ether "Indicorder" continuous chart recording pyrometer

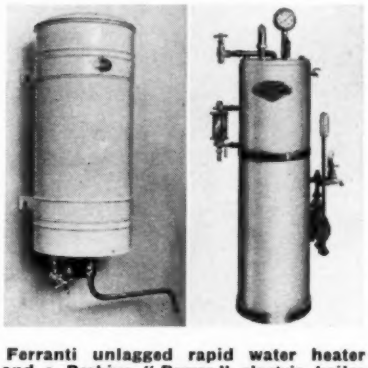
page 249), as fitted to moving-coil regulators, together with examples of the moving-coil regulator and tail-end booster. Besides surge absorbers there will be on view a model surge demonstration set, and other exhibits in the transformer section are a compact, portable 1,500-V d.c. testing set; new transmitter and repeater instruments to give remote indication of the position of some piece of apparatus which has a range of movement between fixed limits; and a model of an oil-sealed calcium chloride breather. The company undertakes the supply of "Nomag" non-magnetic castings for trades of all kinds, and typical samples will be seen.

A new two-rate meter having a self-contained time switch of the self-starting synchronous motor type, will be of particular interest among a complete range of meters which will include the two-part prepayment meter FLP2, the simple prepayment meter, and the type FL meter.

A compact piece of apparatus has been designed for carrying out standard calibration tests on a.c. service meters. There will also be on show a comprehensive range of other types of instruments, in both 2-in. and 2½-in. sizes, such as the light tester, a self-contained instrument with a dual range of 0/25 and 0/250 ft. candles, and the multi-range test set for d.c. or a.c. A selection of relays will be demonstrated on a special panel.

A 4-kW unlagged rapid-heating water heater (illus.) and a hotel-bar water heater are new additions to the range of water-heating equipment. Storage water heaters are now available from 1½-gal. upwards, and there are immersion heaters and circulators for the conversion of existing hot-water cisterns. The "Thermolator" fitted with an "Adjustostat" is a thermostatically controlled unit in which the storage temperature of the water can be adjusted between set limits.

The company's range of electric fires now numbers about forty, and models exhibited will include all the latest "Flamera" imitation coal series. The new "Solium" reflector fitted on all oxy-copper fires has all the advantages of chromium coupled with higher radiation efficiency, and a colour similar to



Ferranti unlagged rapid water heater and a Perkins "Power" electric boiler

burnished copper. Forty standard electric clocks shown will comprise new striking and chiming models, special designs for shallow modern mantels, and a floodlighted dial alarm type. In the radio display will be the latest console and radiogram receivers and two battery models.

Fitz-Gibbon & Murray, Ltd. (Cb. 821)

This company will be exhibiting electric table standards (illus. page 247), three-light pendants, "Jeani" chromium bed-lights and striplights, push-bar switch lampholders, torpedo switches and all types of accessories for telephones, lighting and bells.

Flextol Engineering Co., Ltd. (Cb. 704/805)

Many of the company's power driven hand tools and accessories have been improved and modified. A feature of "Flextol" equipment is that, while a robust motor of ample power and constant speed is employed to drive the flexible shaft, the operator has only a light handpiece to control. Rotary handpieces (both straight and right-angle drive) at all speeds are available for practically all purposes. The type "BG" variable speed filing and grinding machine (illus.) contains an infinitely variable gear, enabling the correct speed for any size file or grinding wheel to be obtained.

Flextol "B.G." variable-speed filing and grinding machine

Geo. H. Gascoigne Co., Ltd. (B. 712)

Applications of the company's patent tubular clamp to the electrical industry include the construction of switchboard frameworks; machinery guards; workbenches; storage racks; scaffolding; permanent, semi-permanent and temporary buildings.

General Electric Co., Ltd. (Cb. 514/615)

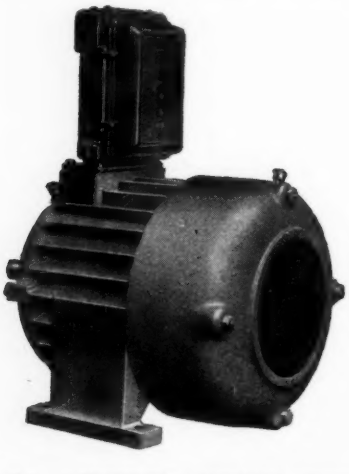
On the heavy engineering side the company has developed a metal-clad "Subgear" unit (illus. page 242), advantages of which are saving of space, speed of manipulation of the breaker unit for inspection and bus-bar selection, safety to operators, and accessibility. It is compound filled, and oil-filled, and the breakers can be arranged for hand control or remote electrical operation. It is available in both single and double bus-bar units suitable for a maximum voltage of 11,000 V, and at 6,600 V and

upwards the circuit-breakers have maximum breaking capacities ranging from 75,000 to 250,000 kVA.

For driving individual machines, conveyor equipment, line shafting, etc., the G.E.C. self-contained geared motors save floor space and reduce power consumption. They are available as squirrel-cage machines from 1 h.p. to 20 h.p. and slip-ring machines from 10 to 20 h.p. for 440-V 3-phase 50 cycle a.c. circuits. With the new "Motorstar" combined motor and starter unit (illus.) no framework or wall-mounting space is required for the starter and external wiring between the motor and starter is eliminated. It is stocked in a range of outputs from 1 h.p. to 10 h.p. and remote control can be provided.

Among the types of arc welding sets chiefly in demand are a.c. or d.c. single-operator sets, enclosed in weatherproof cases and mounted on wheels to give portability. Examples of these will be seen in operation.

Modern illumination practice will be represented by "Osram" tungsten-filament and "Osira" electric-discharge lamps and also by a selection of "utility" lighting fittings, "Gecoray" shop window reflectors embodying a new system of fluting, industrial reflectors, and street lighting lanterns. The street



G.E.C. "Motorstar" combined motor and starter unit

lighting lanterns will include a large decorative "Di-fractor" lantern (illus. page 237) for use with either "Osira" or "Osram" lamps, smaller editions of the well-known "Oxford" and "Watford" lanterns, and the rectangular type "Birchfield" lanterns, which are being employed largely in the street lighting change-over at Birmingham.

For use with "Osram" lamps a new "Wembley" lantern incorporates a rippled outer globe that preserves the light distribution almost unchanged, but gives it a more decorative appearance.

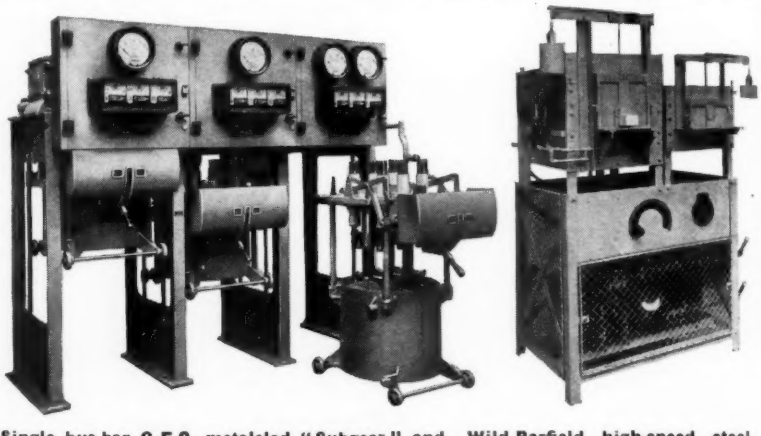
The new "Plafractor" lantern, which is based on the well-known "P.L.A." unit, gives asymmetric light distribution obtained by the addition of a band of glass at the lower edge. A 36-in., 1½-kW rotating air route beacon will be found among a display of aircraft equipment, exciter and other special purpose lamps, "Osira" coloured floodlighting lamps, and film studio units. A new range of metal torches has non-corrosive bodies in attractive colours and gives combined spotlight and focusing with a one-hand thumb control.

A comprehensive industrial cooking equipment exhibit will consist of a double oven range, a grill on a stand, a two-pan fish fryer, and a combined hot-cupboard and bain marie, all shown in a new finish of self-coloured vitreous enamel in grey with black bands and bright relief and white panels. New pastel shades employed for the finishes of the domestic cookers will be seen in a green and ivory home model fitted with the latest type oven thermostat and 8-in. G.E.C. radiant hotplate, and also in a two-tone ivory overseas model. A "Heatstor" cooker of the semi-storage type will be on circuit, and a special display will show a half-section of a standard cooker and a G.E.C. radiant hotplate at various stages of manufacture. The advantages of the new double-rim anti-spillage "Magnet" enclosed hotplate will also be pointed out.

Water heating equipment (immersers and circulators), domestic appliances (including the "Little Wonder" electric brush, a new 1½-pint coffee percolator with an automatic reset device, and a coffee brewer), examples from the current range of electric fires, radio and television equipment will indicate further activities of the company.

General Refractories, Ltd. (D. 810/913)

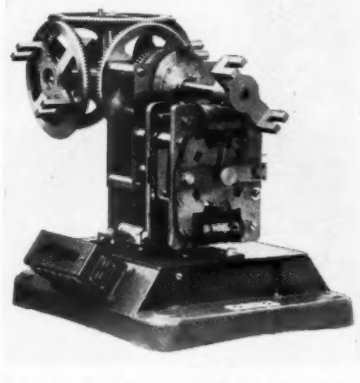
The increasing scope of the company's business has necessitated the taking of a much larger stand this year. The company claims to be the only one in the country supplying every type of refractory material. Special displays will be made of the new "Saxpyre" basic refractory bricks, insulation materials for furnaces and kilns, firebricks and "Durex" plastic refractories.



Single bus-bar G.E.C. metalclad "Subgear" and Wild-Barfield high-speed steel-hardening equipment

Gent & Co., Ltd. (Cb. 606)

A tower clock with four 4½-ft. externally illuminated dials, situated at the entrance to the Fair is driven by a standard Gent synchronous movement, and sixty clocks distributed over the Exhibition buildings will be controlled by a master clock on the company's stand.



Gent synchronous motor for driving large turret clock

On the stand itself will be a 3½-ft. neon illuminated clock; a "round-the-world" clock showing the correct time in different countries; "Pul-syn-etic" electric impulse clocks of wall, mantel, indus-

Teddington hydraulically operated motorised valve (British Thermostat Co.), Canning "Quickplate" plating barrel, and internal construction of a large Dubilier condenser

trial and marine types; electrically controlled workmen's time recorders; process timing clocks; a new synchronous master clock, the "Dac-chronometer," with automatic maintenance power to provide against mains failure; and independent synchronous clocks for industrial and household purposes, including large-type synchronous movements (illus.), suitable for driving the hands of bracket or large turret clocks.

"Tangent" indicator and luminous call systems as supplied to the "Queen Mary," and many hospitals and hotels; wood-cased and metal-clad bells, including the new "Dis-co-Bell," for use where space is limited; fire alarm and detection apparatus; staff locators employing multi-core cable, and also a special system with only two wires; oil and liquid level indicators and alarms, including a new continuous action mains-operated model; relays; mine signalling apparatus; and electro-motor syrens, including automatic or manually operated morsing and coding types are other products to be shown. Electric tell-tale clocks will record on a chart the movements of watchmen at the Fair during the night.

Gittings & Hills, Ltd. (B. 721)

Considerable improvements to "Rockhard" synthetic enamels and lacquers have been effected recently, particularly in the case of heat-resisting materials for fire fronts and other heating appliances. The newest types, requiring only thirty minutes' stoving at 250° F., are capable of withstanding high temperatures for long periods. Water-resisting materials have also been developed, and there are types of special toughness and flexibility for use on meters and other articles subjected to rough usage. All types are available in a wide range of colours. A new factory has been erected in order to cope with the increasing demand for "Lustreloid" cellulose enamels.

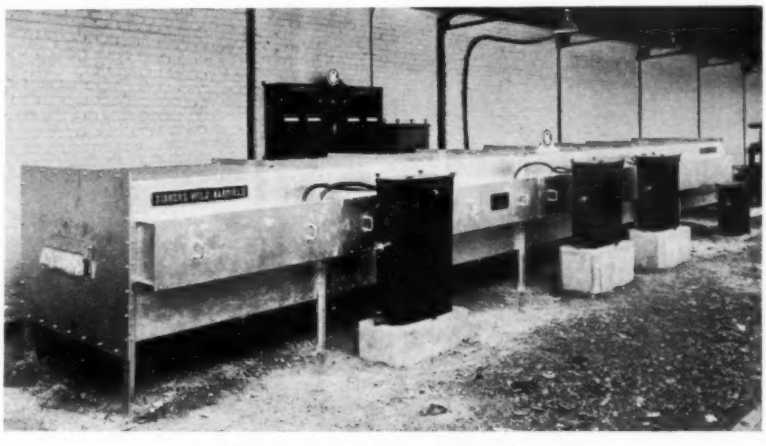
"Metalard" tool and machinery enamels, which are oilproof and dry in under four hours; "Amsuline," an anti-corrosive coating for steelwork, etc.; "Fouramel" liquid wall glaze, suitable for power houses, offices, showrooms, etc.; and "Tower" brand high- and low-temperature stoving enamels are among other exhibits.

James Gordon & Co., Ltd. (Cb. 716/817)

"Mono" combustion recorders of both duplex and simplex types will be shown, the former recording on one chart both CO_2 and unburnt gases ($CO+H_2$), the latter recording CO_2 only. The "Igema" distance water level indicator reproduces the boiler gauge glass at firing floor level, a direct reading gauge making it impossible to mistake an empty glass for a full one and *vice versa*. Drawings, charts and photographs will show the results obtained by the Hagan system of boiler pressure reduction and desuperheating.

Grant & West, Ltd. (Cb. 311)

These specialists in jointing materials will be exhibiting "Tite" jointing compound, "Selek" metal-to-metal jointing material, "Belfo" and "Belfolene" belt treatment, "Ropres" steel wire rope preservative, "Plastiloy" and "Plasticus" plastic metallic packing, "Cretex" waterproofing roof compound, "Riscor" black varnish, "Flinso" tinning compound and aluminium solder, "Revomer" rust solvent, a portable pipe vice holder and a valve-reseating tool.



G.W.B. continuous wire patenting furnace

Greenwood & Batley, Ltd. (D. 314/413)

This company has taken twice the space it occupied last year and will show in operation on production work various products of its tool department, including a "Greenbat" 1½-in. hot forging machine (illustrated), a 220-ton high-speed screw press, a ⅜-in. open die cold heading machine, a ½-in. solid die cold header, and a $\frac{3}{16}$-in. screw nicker.

Greenwood & Batley 1½-in. hot forging machine

Guest, Keen & Nettlefolds, Ltd. (B. 606)

Screws, bolts, rivets, washers, hooks, eyes, nails, etc., products of the companies Darlaston Bolt & Nut Works and of the associated company, John Garrington & Sons, Ltd., will be displayed, and additions to the well-known Nettlefolds and Parker-Kalon products will include recessed screws and drivers, hardened self-tapping screws, and G.K.N. auto centre punches and magnetic drivers.

G.W.B. Electric Furnaces, Ltd. (Cb.302/403)

As the company's electric furnaces are too large for exhibition, photographs will illustrate various types erected recently. These include a large continuous chain conveyor-type furnace for heating of aluminium alloy billets prior to extrusion; a bell-type furnace for bright annealing wire at temperatures up to 1,100 deg. C.; a continuous wire patenting furnace (illustrated), the first of its kind made in this country, working at temperatures up to 1,000 deg. C. and accommodating a maximum of twenty strands of wire at one time; a continuous-type slat conveyor furnace for annealing cast-iron motor-car pistons; a roller hearth furnace for the heat treatment of aluminium billets; and two charging machine-type box furnaces for annealing coils of brass and bronze strip.

Hague & McKenzie, Ltd. (Cb. 500)

The company's range of thick-bottomed aluminium utensils specially constructed for hotplate cooking has been extended by the introduction of additional sizes of egg poachers, fish kettles, fish fryers, and omelette pans. A new electric kettle with a cut-out device will be shown for the first time, and the company has also taken over the sale of the "Gee-Gee Rockit" safety kettle which will now be sold as the "Pyramid Rockit" kettle. The "Pyramid" electric toasters and irons are also to be shown.

G. A. Harvey & Co., Ltd. (B. 622/723)

Sheet-metal products of all kinds will form this company's exhibit and recent developments concern steel equipment for offices and works, the canning industry, and all types of plant in steel, copper, aluminium, nickel and stainless steel up to 1½ in. in thickness and in the largest sizes. Facilities for hydraulic presswork will be available on the stand, and presses able to produce dished and flanged ends up to 10 ft. 6 in. in diameter by 1½ in. thick have been installed. An exhibit of perforated metals and woven wire will be of particular interest.

L. G. Hawkins & Co., Ltd. (Cb. 613)

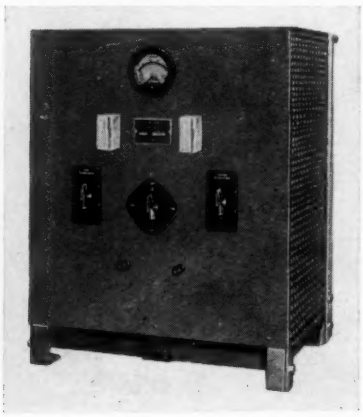
Several improvements have been made to the "Supreme" range of domestic appliances. The electric polisher (illus.) is now supplied with a soft lamb's-wool pad, while long and short handles enable it to be used both for floors and furniture, upholstery, panelling, cars, etc. A scenting device has now been incorporated in the hairdrier, features of which are one-hand sliding switch control, and a streamline design in attractively coloured bakelite. Compactness is a feature of the washer, which requires only 23 in. square floor space when not in use; it is easy and cheap to run and both washing and wringing can be carried out simultaneously. An ironer attachment can be used in place of the wringer.

"Supreme" polisher with hand attachment (L. G. Hawkins)

New designs in lighting fittings will make their first appearance at the Fair, and among other products displayed will be vacuum cleaners, "Sunray" fires, irons, kettles, "Tecal" tea-making sets, toasters, cigarette lighters, vibrators, shaving mirrors, heating pads, "Vioray" high-frequency apparatus and car heaters.

F. C. Heayberd & Co. (Cb. 728)

Battery chargers of both metal and valve rectification types are available (on hire-purchase terms, if desired) to cover practically all commercial, industrial and private requirements. They are soundly constructed with a view



The Heayberd "47" battery charger

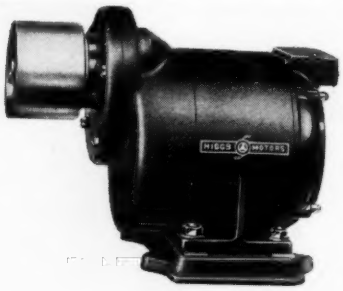
particularly to reliability and continuous operation. A number of improvements in design have been made recently, particularly to the metal rectification types (illus.). There will also be exhibited a wide range of transformers up to 20 kVA.

Alfred Herbert, Ltd. (D. 434 & 409)

A 500 lb. per hour "Atritor" coal pulveriser will fire three small forge furnaces by the ring main distribution system. The "Iron Fireman" coal-burning stoker for firing stoves, ovens and boilers will also be seen, together with examples of the company's small tools and machine-shop accessories, such as die-heads, "Ardoloy" tipped tools, "Wickman" type adjustable gauges for plain and threaded work, matrix broaches, gears and clutches, "Pratt" lathe chucks, and dead-length bar chucks.

Higgs Motors, Ltd. (Cb. 408)

Electric motors for industrial and domestic use will include a.c. and d.c. industrial motors and a range of fractional h.p. machines, geared motor



A Higgs geared fractional h.p. motor

units, polishing and grinding motors and small electric tools. Among an improved range of fractional h.p. motors up to 1 h.p. at 1,425 r.p.m. will be a geared motor unit (illustrated) with a ratio of 6 : 1.

A working exhibit will be the first industrial motor manufactured by the company twenty-five years ago and which has been in constant use ever since.

Holden & Hunt (Cb. 802/903)

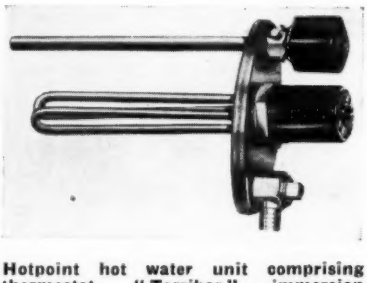
Among a very complete range of low-voltage resistance welding machines of the spot, butt and flash butt types, most of which will be shown in operation, there will be a new 25-kVA spot welder (illus. page 247), designed for high-speed welding on light sheet-steel. In spite of having very little foot-pedal travel, it gives extremely heavy pressure on the weld, and does not require a timed weld. The welding gap is readily set to 5/16 in., and an automatic trip switch is fitted at the rear. A four-way heating-speed box on the side covers the machine range. The machine is substantially constructed, easy to operate and capable of very high-speed production, without causing fatigue.

Several new features are embodied in a 12-kW spot welder with a weld time valveless control gear which fully covers the machine range by simple settings. By means of a simple switch the timing gear can be used or cut out, so leaving the machine to be a plain spot welder. The means for fitting special jigs and stakes, and the arrangements for adjusting the pedal make the machines extremely adaptable for handling awkwardly shaped articles. The "Scadeu Reg." spot welding electrode copper for welding tips, has a life of six to eight times that of hard electrolytic copper.

The range of butt welders covers a welding capacity from 1/32 in. dia. to 1½ sq. in., four models being completely automatic in action. Visitors are invited to test the simplicity of operation by making welded samples for themselves. Apart from the machines shown the company specialises in chain-making plant, rivet-heating machines, brake drums and all classes of wire goods fabricated by the use of its own welding machines, such as refrigerator and oven shelves, wire frames for lampshades, etc. A large, new tinning department will enable the output of tinned articles to be increased.

Hotpoint Electric Appliance Co., Ltd. (Cb. 600)

Electricity supply authorities running a range of cookers will be interested in



Hotpoint hot water unit comprising thermostat, "Torribar" immersion heater, 3-way flange and draincock

three new models, Nos. 5011, 6042 and 8012, in which the corresponding parts (boiling plates, grill boilers, thermometers and switches) are interchangeable. All cookers can be fitted with "Torribar" radiant boiling plates, which are now available with four heats, permitting simmering on the lowest.

Consisting of a heating element embedded in a mass of rock-hard magnesium oxide at the centre of a solid-drawn copper tube, the "Torribar" immersion heaters (illustrated) and circulators have a high performance and low maintenance costs, and under normal service conditions are practically indestructible. The fact that the compressed magnesium oxide, whilst being an excellent conductor of heat, is also an electrical insulator, ensures absolute safety, since the spiral heating element cannot come into contact with the outer sheath.

Outstanding features of the Hotpoint washing machine (illustrated page 245) are the design of the gyrator, which, in conjunction with the unique square-shaped cast-aluminium bowl, produces a water action which cleanses perfectly the dirtiest and daintiest garments without damage; and the wringer, which is fitted with oversize rubber rolls, the upper one soft and the lower hard, ensuring perfect water extraction without the possibility of damage. Recent improvements are the instantaneous tension release of the wringer, hinged tub support and rinsing tubs, novel tap-in-drain hose, and the provision of 5 yds. (instead of 3 yds.) of rubber-covered flexible cable, special cable clips, and the latest B.T.H. wound stator ¼-h.p. motor.

The exhibit will also include vacuum cleaners, fires, kettles, irons and toasters.

Imperial Chemical Industries, Ltd. (D. 306)

On this stand will be shown salt bath furnaces for all ferrous heat treatment purposes. Specimens of heat-treated steel will be displayed, and visitors are invited to bring samples of their products for hardening.

I.C.I. Metals, Ltd. (D. 402/503)

In response to an increasing demand from the air, rail and transport industries, aluminium alloy will be shown for the first time. Brass, copper and other non-ferrous alloys will be seen in plates, sheet, strip, wire, rods and sections, and there will be examples of the "Broduit" copper conduit system, which is claimed to be cheaper than best-class steel, cannot corrode, saves weight and has definite mechanical and electrical advantages. "Everdur," a copper-rich alloy of copper, silicon and manganese, is suitable for the manufacture of storage tanks and heaters, and for use in battery rooms, &c., where smoke and acid fumes quickly destroy ferrous metals.

International Combustion, Ltd. (D. 202/303)

"Energy," a film review of the company's Derby works, has as its main feature the construction of a large "Lopulco" mill, one of a batch for the East Perth power station, Australia, and other items of plant for the same station. It also shows the welding of fin tubes for water-tube boilers; the shrinking of the gills to economiser tubes; the continuous moulding and casting plant which is capable of producing 50,000 castings per week; the assembly of large "L" type travelling grate stokers and small "Robot" domestic stokers.

On the stand surrounding the cinema will be exhibits of the subsidiary Riley Stoker Co. whose underfeed firing principle ensures an economic consumption of fuel and the entire elimination of the smoke nuisance.

Jackson Electric Stove Co., Ltd. (Cb. 509)

Among a complete range of domestic cookers will be the two latest models, the 92J and 93J, in mottled grey vitreous enamel and coloured enamel finishes. The elements are of the plug-in type and interchangeable. In the "90" series all the oven elements plug into the sides of the oven, thus leaving the floor of the oven free for cooking purposes. Conspicuous among electric cooking apparatus for hotels, restaurants, institutions, etc., will be the latest type of chef's range (illus.).

Electric fires (1, 2 and 3 kW) will include light cast models, portable reflec-

Jackson fall-down door type chef's range

tor and inset type fires. Thermal storage water heaters exhibited conform generally with the B.E.D.A. Water Heating Committee's recommendations, while the latest square and circular type wash-boilers have white enamelled lids.

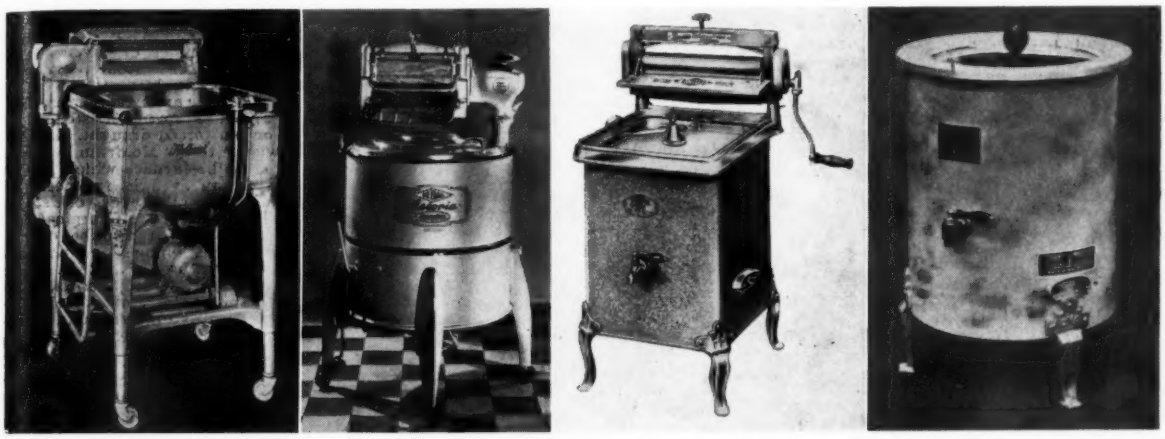
Walter Johns, Ltd. (Cb. 229)

The "Nixin" lamp holders (illus. page 251), plugs and adaptors shown provide for the connection of the flex firmly to the accessory without tools. There are no loose parts, screws or otherwise, and the contact is of far greater area than the orthodox type.

Johnson, Matthey & Co., Ltd. (Cb. 312)

The company's first appearance in the Electrical Section indicates the growing importance of its electrical manufacturing business. In addition to a wide range of precious metal contacts, specimens of contact bi-metal will be exhibited, giving indications of their applications. Another item of interest is a demonstration of silver-brazing alloys and silver solders, including "Silfos" for use on brass, bronze, copper, and "Easy-flo" (a comparatively new alloy which has been found eminently

suitable for jointing dissimilar metals, and which can be employed on brass, copper, bronze, tungum, nickel alloys, with Klaxon audible signals, controlled by the telephone-ringing circuit, for use in noisy situations; and "Klaxon-rack, automatic defroster, external cold control, fast freezing and finger touch door fastener.



New types of domestic laundry equipment: The improved Hotpoint machine, the "Bedal Astoria" model "M" (British Electric Domestic Appliances, Ltd.), the Burco "Coronation" washing cabinet and the latest "Uno" wash-boiler (Universal Boilers & Engineering Co.)

monel metal and all grades of steel, including stainless steel.

Other products shown include platinum and silver foil; pure platinum wire for fuse and resistance purposes; superfine resistance wires in nickel; phosphor bronze, copper, etc.; fine silver fuse wires; and very small gauge metal tube.

Richard Johnson & Nephew, Ltd. (D. 700 & 801)

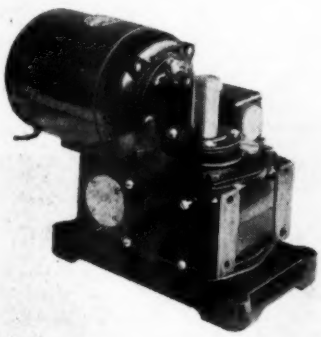
A full range of materials of interest to the electrical trade will include copper conductor wires, together with conductor material of steel, copper, cadmium copper, and steel-cored aluminium, in a varying range of sizes.

Kitchendom, Ltd. (A. 702)

The latest types of kitchen cabinets shown have refrigerators, radio receivers, etc., built in.

Klaxon, Ltd. (Cb. 316)

Fractional h.p. motors, of 0.02 to 0.5 h.p., are available in practically any type of winding, *e.g.*, universal, d.c. series, shunt and compound, a.c. split phase, capacitor, shaded pole, synchronous, two- or three-phase squirrel-cage, and variable speed repulsion. There are also motors fitted with centrifugal electric



Klaxon "AK-MVS" double-worm heavy-geared motor unit

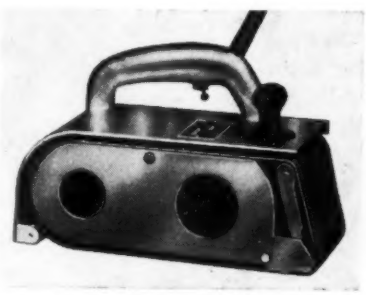
governors capable of maintaining the speed constant within plus or minus 1 per cent.; these units are also available with variable speed governors.

Geared units can be supplied incorporating any of the above motors, together with single and double worm (illus.), single, double and triple spur, and combinations of both worm and spur gearing, to give practically any speed between about 0.1 and 1,500 r.p.m.

Other products of which specimens will be on view are grinding and polishing units; industrial audible warning signals, including motor-driven hooters with ranges from 220 yards to one mile in still air; electric air syrens with ranges from ¼ to 5 miles; high-frequency buzzer signals, including flameproof mining types; a new type of relay for use Mercon" sign flashers for the animation of neon and other signs, as well as for industrial uses.

Landale & Co. (B. 309)

A new overhead sliding radial arm instantly converts the company's model 12 "Swifsure" saw into a straight line cross-cut saw, this giving all the advan-



"Swifsure" portable electric sander (Landale & Co.)

tages of the large fixed model with the additional merits of portability, low initial, maintenance and running costs. Among other electrically operated tools will be a full range of "Swifsure" saws, dovetailers and portable sanders (illus.). The last-mentioned machine is claimed to be the only all-British machine working on the band principle, and it requires no adjustment, the tension and alignment of the belt both being automatic. A fixed centre chain drive is provided by a Renold "Duplex" chain.

Leda Electric, Ltd. (Cb. 705)

Apart from the larger refrigeration plant such as commercial cabinets, ice-cream freezers and storers, milk bars (illus.), &c., this company is showing domestic refrigerators, special features of which are their all-steel construction, interior lighting, bar type shelves and egg

London Aluminium Co., Ltd. (A. 408/511)

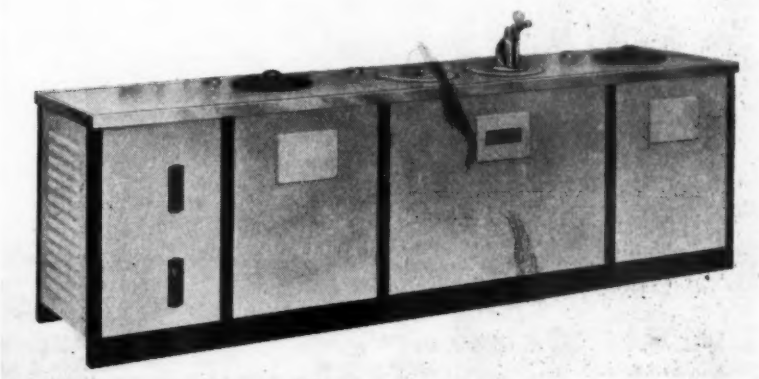
The new "Diamond 550" seamless aluminium electric kettle has an extra large immersion element provided with a float-action automatic cut-out, which is claimed to be the only one on the market which does not produce a spark when the circuit is broken. With a loading of 1,750 W it will boil three pints of water in four minutes. Other types of electric kettles, coffee percolators will be found, together with a wide range of special aluminium ware for hot-plate cooking.

London Electric Wire Co. and Smiths, Ltd. (Cb. 610)

A joint exhibit with the incorporated company, Fredk. Smith & Co., presents a varied range of electrical conductors including "Anacos" bare conductors, from the finest wires on reels and copper strip to trolley wires, overhead power lines, heavy rods and bus-bars; commutator bars; earth rods for radio and electrical power purposes; insulated wires including the enamel and paper-insulated wire, type TDF.318A, which has been specially designed to give a high dielectric strength with a low space factor; "Lewbestos" wires and strips, which are well known for their dependable reaction to high temperature rises, the special asbestos insulation minimising risk of burnouts; cotton, silk, enamel and paper-insulated wires, bell wires and dynamo flexibles; and "Lewcos" copper braids and cords.

Joseph Lucas, Ltd. (Cb. 601)

Visitors will be able to see demonstrations of the company's latest products under actual working conditions and of the testing apparatus used in the Lucas factory. Recent developments in car equipment are a combined acid-level indicator, vent plug and filler cup for batteries; the "FT.57" fog lamp and "Passlight" flat-topped beam models, and a dual-arm windscreen wiper with concealed motor. A new "Silver King" dynamo set has been produced for bicycles. Special attention is also drawn



Leda sectional milk bar refrigerated unit

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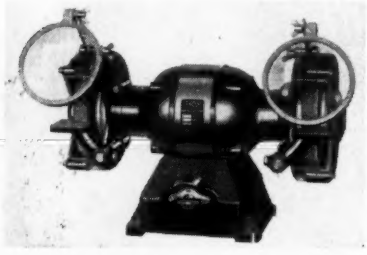
to a comprehensive range of "Rotax" electrical equipment for aircraft.

Safety in control and handling, sturdy construction and low current consumption, are claimed for "Rotax" electric tools. Running exhibits will include high-frequency portable drills, grinders



Lucas "Rotax" 7-in. bench grinder

and sanders for production work, while also available for demonstration will be ¼- and ½-in. drills on stands, a $\frac{3}{16}$-in. aero drill, an adjustable screwdriver, a $\frac{5}{8}$-in. valve refacer, and a 7-in. ball-bearing bench grinder (illus.).

MacGregor & McCallum, Ltd. (B. 814/913)

The "M.2 Mayfair" gyrator washer, which replaces last year's "M" model, has an extra capacity tub and incorporates a new type of rubber-mounted motor which is silent and needs no lubrication. The wringer is fitted with 2¼-in. rollers and an automatic tensioning device, with an improved safety release. The de luxe model M.3 incorporates a special streamlined tub.

A new de luxe "Magic" vacuum cup machine (illus.), the G.3, has a novel streamlined body finished in white or in cream and green, and is air lagged to conserve heat. Large rolls and a trigger action safety release bar running the entire length of the rolls are features of the wringer. New streamlined automatic reversing drip trays are also included. The well-known "Magic Major" and model F are shown with new wringers. A pump for emptying, the "Filordrain" suction attachment for filling and emptying the tub, and an improved wringer post ironer, can be fitted to all models.

Other exhibits are the "Beach" electric refrigerator with its extra large food storage space, and a range of modern lighting fittings.

Donald Macpherson & Co., Ltd. (B. 623)

On a stand appropriately decorated in Coronation colours there will be, in addition to standard synthetic finishes, an aluminium paint suitable for the severest exposures and which will bake at 400° F. It is suitable for interiors of bakers' ovens, electric cookers, &c.

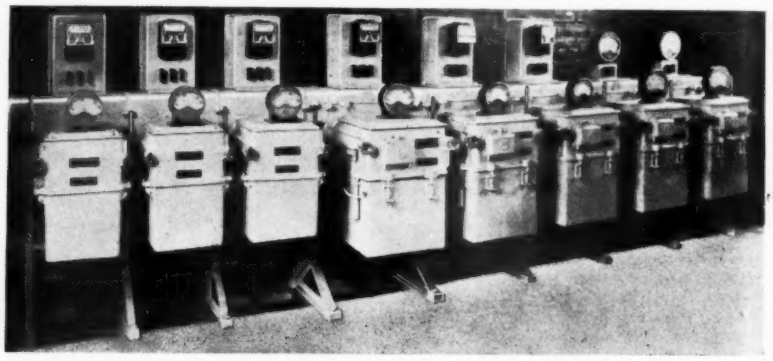
Realising that the galvanised pylons throughout the country will some day require protecting with suitable paints, the company has had a line of pylons in the Derbyshire hills painted with special "Foochow" pylon paints for a period of five years, under the observation of the Yorkshire Electric Power Co., which now reports that the material is superior to any other used. A new book entitled "Modern Industrial Finishes" will be available for free distribution.

M. & C. Switchgear, Ltd. (Cb. 692)

Metal-clad oil-immersed switchgear from 30 to 1,200 A for all purposes will comprise a 16-panel pedestal-mounted circuit-breaker board for a large creamery; a somewhat similar board for an ironworks (illus.); a cubicle mounted switchboard for a food factory; a 200-A, 3-phase wall-fixing cubicle mounted oil circuit-breaker, and Buxton tested 5-h.p. straight-on starters, with and without isolators. There will also be a complete range of contactor operated gear from ½ to 150-h.p. remote control, disconnecting link boxes, junction boxes, lighting fittings, &c.

Martindale Electric Co., Ltd. (Cb. 807)

A new "Mill-type" "super-blower," fitted with a 1-h.p. motor, is claimed to be the most powerful portable blower made. This, together with an improved standard blower, will make its appearance among a representative display of the well-known "Martindale Commstones," "Jiff-V" motor-driven under-



A pedestal mounted oil circuit-breaker board (M. & C. Switchgear)

cutters, "Junior" commutator grinding tools, voltage testers, protection masks, electric etchers, "Super" syrens (½-2-mile range), and "Kay-Jay" safety road signals.

M.C.L. & Repetition, Ltd. (D.506)

Repetition products in a variety of shapes and sizes are manufactured from the bar, in bronzes, copper, freecutting steels, high tensile steels, special alloys, etc. A working exhibit will demonstrate armature winding for dynamos suitable for use in motor vehicles, launches, etc. Thermostats produced by Robert MacLaren and Co., and including parts manufactured by M.C.L., will be displayed, as well as the "Versa Vice," which is manufactured entirely by this company.

Meldrums, Ltd. (D. 212)

The main exhibit will be a complete mechanical stoker for a Lancashire boiler. The stoker for one flue is arranged as a "Koker" stoker, and the other as a sprinkler stoker. The "Koker" stoker is arranged for natural draught, and the sprinkler stoker for steam jet or fan forced draught. Another item shown is the "Meldrum" steam jet forced draught furnace which is also supplied as a fan draught furnace, and is applicable to all types of steam boilers, stills, coppers, metallurgical furnaces, etc. There will also be one of the company's well-known incinerators. Steam jet apparatus, *viz.*, stills, water heaters, agitators, compressors, exhausters, acid elevators, etc., are available in cast iron, gunmetal, acid-resisting metal and regulus metal.

Metlex Industries, Ltd. (A. 420)

Here will be seen the latest ideas for bathroom fittings and furniture. The standard electrically lighted cabinet has been redesigned so that the bulb may be changed, if necessary, without taking the cabinet down from the wall. Shown for the first time is a combined cabinet and splash back recessing into the wall above the splashback.

Metropolitan-Vickers Electrical Co., Ltd. (Cb. 806)

Battery-operated vehicles, suitable for commercial use as tradesmen's vans and for municipal services, are available in three sizes, all of which will be represented, the 18-22-cwt. (illus.) and 7-9-cwt. sizes complete with commercial van bodies, and the 10-14-cwt. chassis without body to show the chassis construction and the arrangement of operating parts. The driving motors are robust traction-type machines similar to the larger models supplied for electric railway, tramway and trolley-bus services. The motor drives through a transmission

Moffats "M.32" refrigerator, English Electric "H.C.212" cooker, MacGregor & McCallum "Magic" vacuum cup washing machine and Pressed Steel Co. "481" refrigerator

shaft and back axle differential gear somewhat similar to motor car practice, but with the difference that the drive also incorporates a reduction gear of high ratio to allow the use of an economical high speed for the motor. Quiet operation of both motor and gear has been given special consideration. A motor and rear axle drive will be shown separately, and also the new type of foot-operated controller which is incorporated in the new models.

" Metrovick " 18-22 cwt. battery operated van

Moffats, Ltd. (Cb. 611)

A model kitchen will be a feature of this stand. The new small cookers, models 21M. and 22M. (illus. page 237), will be shown in the regular " A " finish popular for hire schemes, in the super de luxe " C " finish with white porcelain body sides, and in a number of coloured finishes, such as two-tone ivory, ivory and green, ivory and jet black, and ivory and red.

" Therm-o-matic " oven control for both vertical and horizontal cookers will be conspicuous. Minor improvements have been made to the vertical type thermostat, which is now available for double-pole operation. The mechanical heat indicator has been enlarged to approximately three times its original size, and a glass cover plate has been fitted to prevent the indicator itself from being accidentally touched.

For the first time the de luxe heavy duty bakers' ovens will be exhibited equipped with thermostatic heat control, armour-plate glass inspection window, and provision for steam injection. Top and bottom heating is spread over the entire oven, which has a fireclay bottom.

Among refrigerators will be seen the new M.32 3-cu. ft. model (illus. page 246). The company claims to be the only manufacturers standardising on full porcelain enamel refrigerators, which feature is important in any long-term hire-purchase scheme, since the finish is permanent and will not flake or fade. Ivory bodies with coloured bases give the refrigerators a very attractive appearance. Minor alterations have been made in the interior shelf arrangements, while improvements to the compressor and the motor result in more silent operation.

A. E. Morrison & Sons, Ltd. (Cb. 812)

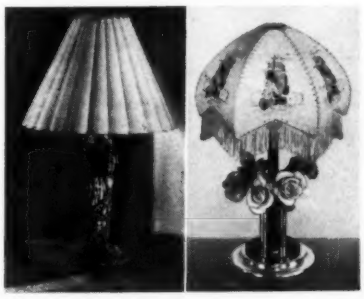
The 107th Morrison-Electric vehicle supplied to the Midland Counties Dairies will be an interesting item on this stand, where examples will also be on view of the " F60 " vehicles with pressed steel bodies for the Walsall Co-operative Society and the vans used by Prices (Bakers), Ltd. In addition, there will be a stripped chassis, with fluid flywheel transmission, and a cut-away section of a fluid flywheel.

Morse Chain Co., Ltd. (D. 704/895)

Standardised drives through the medium of rocker-joint inverted tooth and segmental bush roller chains cover a wide range of speeds and are capable of transmitting up to 100 h.p. Samples of chain to transmit greater horse-powers and with which suitably larger wheel diameters are obtainable indicate the widest possible applications. A flexible coupling and cover in section shows the construction and ready means of installation, and a working model of the segmental bush roller joint illustrates the oil pumping action during articulation of the joint members. Camshaft drives and tensioners are also among the exhibits.

David Moseley & Sons, Ltd. (D. 719)

Among a comprehensive range of mechanical rubber and vulcanised products for all industrial purposes will be the solid rubber " Moslite " lamp standard (illus.), which is shockproof, will not damage the surface of polished furniture,



Moseley rubber lamp standard and a Fitz Gibbon and Murray fitting

is unbreakable, and is supplied in plain and mottled colours. Other items shown will be sheeting and tubing; rollers in soft rubber and in black and white vulcanite; mechanical moulded rubber products, including anti-corrosive goods for use in the chemical industries; ebonite sheets, rods, pipes, branches and elbows.

Moulded Products, Ltd. (Cb. 309a)

Of chief interest among a wide range of moulded units for the electrical and allied trades will be mouldings of modern design for telephone, switchgear and electrical accessories. " M'Prolite " moulded electric lighting fittings are available in many delicate colours and attractive designs.

National Time Recorder Co., Ltd. (B.319)

A patent check action all-metal recorder will be of particular interest among time recorders and costing machines of all descriptions. The latest " Universal " costing machine is portable and especially adaptable for costing on different jobs. A full range of electric self-winding transmitting master clocks and dials is available.

James Neill & Co. (Sheffield), Ltd. (D. 625 & 627)

" Eclipse " non-magnetic chucks and accessories will include both rectangular and circular models, the latter being demonstrated on a lathe. A new circular model is 6½ in. in diameter and is designed with a special arrangement of the poles to provide maximum holding capacity for small work. The shunting of the magnetic flux to release the work is obtained by a method similar to that of the other models. The " Eclipse " quick release hand magnet is handy for separating ferrous parts, checking separators, testing ferrous inclusions in foodstuffs, and collecting small steel articles.

Hack-saw blades and frames are shown separately and for the first time the " Handyman " assortment packed in cartons is available, comprising a range of blades in assorted pitches of teeth. " Eclipse " composite steel (steel faced iron) is also exemplified in different sections and qualities.

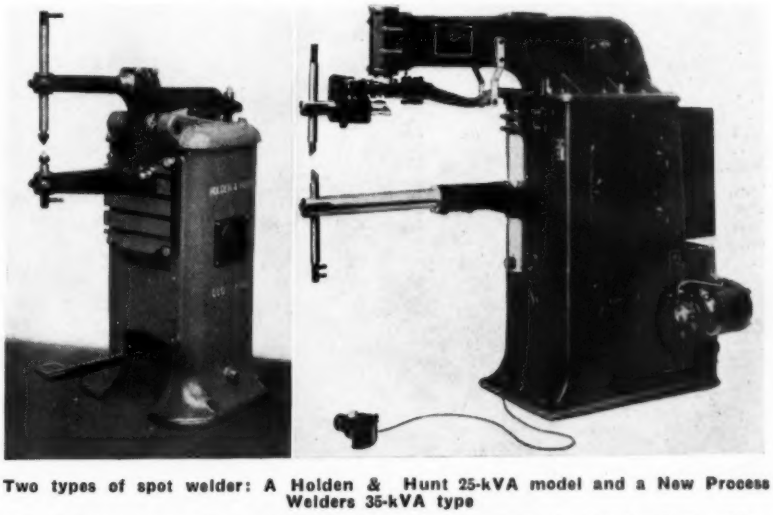
New Process Welders, Ltd. (Cb. 221)

The largest welder shown, a 50-kVA pneumatically operated twin spot machine, is specially designed for welding large sheets. By the use of two transformers and as the throat of the machine does not constitute a magnetic field, sheets of any size may be welded without the losses experienced on some machines.

A new 35-kVA pneumatically operated fixed head spot welder (illustrated) is fitted with universal electrodes and with a novel style of vertical bar fixing for the lower arm. It is so designed that it may be supplied either as a pneumatically operated machine for single spot welding, or for stitch welding; a pedal operated machine; a motor-driven spot welder, or a seam welder, and the changes from any one type of operation to another may be effected within a few hours at the most.

An 8-kVA spot welder will also be shown, together with a pneumatic conversion set, by the use of which the machine may be used as a single spot welder or a stitch welder, the welds being automatically controlled in each case. This conversion set may be fitted to any type of welder. For dental work, valve and lamp filament parts, and for welding the wire to the tags in telephone coils, etc., there is a neat 2-kVA machine.

Butt welding machines will include a fully automatic motor-driven rim welder, capable of 500 welds per hour. A semi-automatic 20-kVA flash welding machine, operated by means of a hand lever through a cam, is also shown, in addition to a small wire jointing butt welder of 5-kVA capacity. In addition there will be samples showing the work to which resistance welding is applicable.



Two types of spot welder: A Holden & Hunt 25-kVA model and a New Process Welders 35-kVA type

Osborn Manufacturing Co., Ltd. (Cb. 814)
A new range of "Cobra" lantern bedroom and landing lights will be available in many attractive colours and finishes.

P.B. Sillimanite Co., Ltd. (Cb. 604)
This company will be exhibiting a representative range of electrical refractories in the manufacture of which "Sillimanite" plays an important part by virtue of its high electrical resistance at elevated temperatures and with increased loadings. This material has enabled manufacturers of refractories to work to closer limits on dimensions, and to supply a product that stands repeated heating and cooling without cracking.

Henry Peace, Ltd. (Cb. 712/813)
Overhead fittings, trolley heads and wheels, ears and sleeves, crane collecting gear, elevating or tipping nuts, controller fingers and brush-holders, and electric vehicle spares will be among this exhibit of non-ferrous castings, electrical controller and overhead equipment. There will also be sundry lines for the general electrical maintenance of plant, together with bell transformers and radio components such as mains transformers, chokes, resistances and h.t. units.

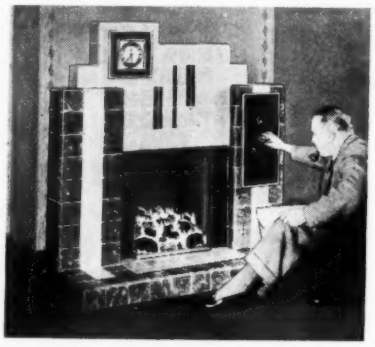
Perkins Clean Milk Equipment, Ltd. (A. 725)
In addition to self-contained electric sterilising outfits of the "Aylesbury" and "Lethal" types, the company also produces the "Power" electrode boiler (illus. page 241), specially designed for farm use. It is loaded at 15 kW and is claimed to have an evaporative capacity of 45-50 lb. and to work efficiently sterilising chests up to 48 cu. ft. capacity. Electrically driven "Perfection" bottle washers are available in various sizes.

Pinchin, Johnson & Co., Ltd. (Cb. 414/515)
This display will comprise finishes for both industrial and decorative use on actual products, including electric fires, refrigerators, &c. Panels will show various decorative materials and particulars of insulating varnishes and the "Vigorised" wet-on-wet process, the latest development for brush and spray application, will be available.

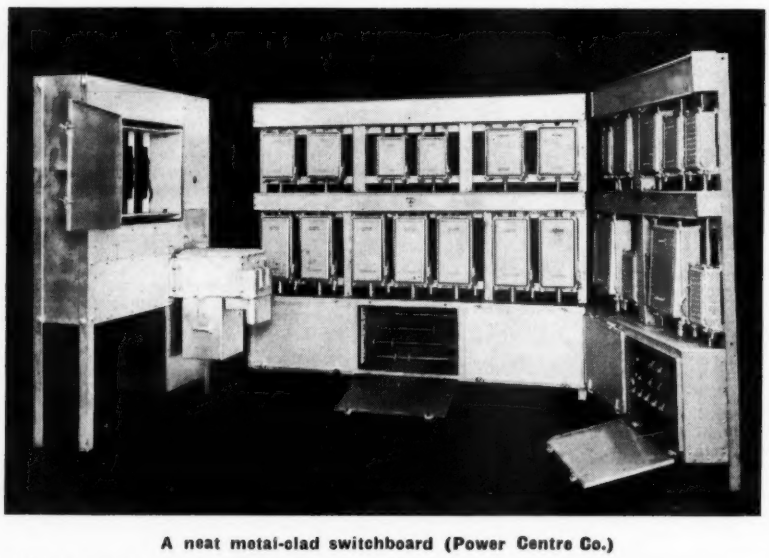
Poles, Ltd. (Cb. 709)
The new "Adastra" poles to be shown are a development of the company's sectional steel pole and lighting standard introduced last year, and are constructed from easily assembled sections which nest together for transport. The interlocking elliptical sections combine strength with lightness, and poles of any height and strength can be made from standard sections. The newest feature is the adoption of a rust-proofing process which gives a true penetrative layer, both inside and out. A 25 years' guarantee is given.

Power Centre Co., Ltd. (Cb. 712/813)
As an alternative to multiple runs of conduit, with bends, tees, junction boxes, &c., a single run of "Turret" trunking, taking all the necessary cables, gives a neat, workmanlike, inconspicuous job with a great saving of time, labour and material. Inspection covers with detachable lids in every length facilitate extensions and obviate damage to cabling through "drawing-in" difficulties. In addition to numerous installations in public buildings, churches, factories, hospitals, schools, cinemas, hotels, generating stations, garages, railway stations, &c., the system is becoming increasingly popular in the smaller sizes for shop window and stage lighting, &c.
Other of the company's products include switchgear (illus.) and bus-bar trunking, which bear the same stamp of neatness and convenience.

Precision Electric, Ltd. (B. 314)
The compactness of the "Radiomant" fireplace surround unit (illus.) with its inset radio receiver and electric clock makes it eminently suitable for the modern house or flat where space is a consideration. The surround is of tiles,



"Cleveley" type "Radiomant" (Precision Electric Co.)



A neat metal-clad switchboard (Power Centre Co.)

several attractive colour combinations being available.

Pressed Steel Co., Ltd. (Cb. 721)
Four new refrigerators of moderate price yet with generous capacity will make their first appearance on this stand. They are models 371 (3.6 cu. ft.), 461 (4.5 cu. ft.) (illus. p. 246), 681 (6.7 cu. ft.), and 911 (9 cu. ft.). Of modern streamline design, the machines are neat in appearance, and special attention has been paid to facilitate cleaning, all the corners being rounded. The cooling units are of extra large capacity so that, apart from the making of ice cubes, they can be used for the storage of ice-cream and other frozen foods at temperatures below freezing. The method of mounting the compressor ensures quietness of operation and freedom from vibration.

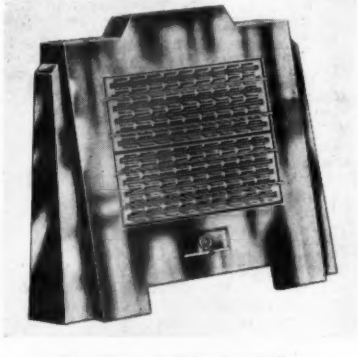
Silas Quaker, Ltd. (Cb. 914)
New 5- and 15-A, 3-pin plugs will be seen among this company's exhibits, which will comprise all types of electrical fittings for ships, railways, airplanes, &c.; bakelite electrical accessories, battery table lamps and torches.

Radiovisor Parent, Ltd. (Cb. 419)
Demonstrations will be given of two new pieces of light-actuated apparatus, one for controlling the temperature of electrically heated bars (illus. page 249) and the other for controlling the fuel supply to oil burners. The use of the Radiovisor system for controlling street lighting according to daylight intensity is growing rapidly, particularly in connection with traffic signs, traffic roundabouts and refuges. The system is also being employed largely for the lighting control of factories, offices, entrances, corridors, and staircases. Besides the company's smoke indicator, such as is already used in a number of the large power stations, a modified smoke alarm equipment has also been developed for use in factories. Counting units, visibility indicators, turbidity indicators, paper-registering devices, door openers, burglar alarms, hopper controls, &c., are other examples of the applications of light-actuated apparatus.

Rapid Magnetting Machine Co., Ltd. (Cb. 512)
A specially attractive exhibit combines five types of electro-magnetic separators on one structure using one common hopper over a conveyor belt to feed whichever separator it is desired to demonstrate. The demonstration will particularly interest those handling such products as foundry sand, limestone, granite, coal, &c.
The company's new "Rapid" self-discharging chute type magnetic separator, shown for the first time, will be supplied in a number of sizes and will be especially suitable for the treatment of materials of a dry nature or granular form such as corn, wheat, rice, tea, dried fruits, sands, chippings, non-ferrous metal borings, &c. Its running costs are said to be exceptionally low. The "Rapidity" electro-magnetic separator, which is claimed to be the fastest in the world for dealing with feebly magnetic ores, &c., will also be shown, together with a drum-type separator for swarfe and borings and a wet type for liquids, which will be seen in operation. Exhibits will also include drum- and vibratory chute-type separators, magnetic chucks, clutches, and magnets for scrap sorting.

Rawlplug Co., Ltd. (Cb. 308)
Besides exhibiting a complete range of fixings and tools this company will be giving practical demonstrations of how to make firm fixtures.

Revo Electric Co., Ltd. (Cb. 404/505)
The new "Coronette Cooker" has been designed specially for flats and small homes. It is compact yet has all necessary features, including a 4-heat simmering-boiling plate. Other types of cookers will be shown fitted with various types of boiling plates now manufactured by the company, including a totally enclosed 3-heat and the new enclosed 4-heat simmering plate, as well as the "Superspeed." It is hoped also to show cookers fitted with the new "Radiant" boiling plate with tubular coiled element, which is now being put into production in 3-heat and 4-heat types and will be available for replacement in practically every type of cooker now in use.
The new season's fires, comprising popular modern cast designs (illus.) and new inset and outset types, will be shown for the first time, while amongst the smaller domestic appliances will be electric irons, boiling plates, grill boilers, toasters and fans. Tubular heaters and panel heaters are enjoying great popularity, and to the range of wash-boilers has been added the "Superwash"



The Revo "Criterion" fire

(illus. page 250), an inexpensive model suitable for hire schemes.

The drive for road safety has resulted in many improvements to traffic signs and guard posts. Among street-lighting equipment a range of fittings has been developed for use with sodium and mercury lamps. To complete the inside exhibit there will be samples of the latest switch and fuse gear and electric fans.

In the outside "Quarry to Road" section a display of street-lighting equipment will permit comparison of the efficiency of the new sodium and mercury lighting fittings with other types.

Rheostatic Co., Ltd. (Cb. 410/511)

In view of recent discussions on the subject of cooker control a display of cooker thermostats (illus.) will be featured prominently among a range of thermostats for automatic control of electric water heaters, room heaters, etc. Other devices will be shown for temperature control of central heating, and there will be demonstrations of the application of the controls to various kinds of heating installations. Among new apparatus shown will be a range of motorised valves for hot water and steam, pressure switches and a control box for automatic coal stokers.

The "Satchwell C.S." cooker thermostat (Rheostatic Co.)

Runbaken Electrical Products (Cb. 910)

Among a representative selection of test and repair equipment for electricians and garages will be a neat electric hand grinder (illus.) which can also be used for drilling, sawing, polishing and engraving. The company's products also include electrical test benches, dynamometers, coil, condenser, magneto, plug, battery, lamp, and insulation testers, meters of all kinds, chargers, magnetic retrievers and electric embossing pencils.

Ruston & Hornsby, Ltd. (D. 318)

This stand will consist entirely of a boilerworks exhibit, including horizontal and vertical "Thermax" boilers. There will also be a small vertical boiler built for 80 lb. pressure, air receivers and examples of special welded and riveted work. The horizontal-type boiler shown will be of 3,500 lb. evaporative capacity, the dimensions of the shell being only 10 ft. long by 7 ft. diameter. It will be fitted with an electrically driven induced-draught fan. The vertical boiler exhibited will be one of the smaller sizes of the range, which extends from 500 to 6,000 lb. evaporative capacity.

Joseph Sankey & Sons, Ltd. (A. 512 and B. 707)

This company, which has specialised in the production of electrical steel and stampings for nearly fifty years, will be showing a comprehensive range of laminations as used by all branches of the electrical industry. Among its best-known brands are "Stalloy," "Medium Resistance," "Special Lohys" and "Lohys." Samples of "Stalloy" diaphragms will also be included, together with samples of pressings.

Siemens Electric Lamps and Supplies, Ltd. (Cb. 607)

The general lighting of the stand itself will be carried out by means of 500-W "Sieray-Dual" lamps in industrial reflectors. A representative range of "Sieray" electric discharge lamps will comprise high-pressure mercury types, including new 80-W and 125-W lamps, as well as "Sieray-Dual" lamps and floodlighting tubes.

An interesting exhibit will show the stages in the manufacture of tungsten wire at the Siemens lamp works at Preston, and a showcase will indicate the steps in the production of a general service lamp. Lamps specially featured will include a 5-kW searchlight lamp. Street lighting lanterns of the "Preston-Sieray," "Regent-Sieray," and "Bi-Way" types are shown and "Sieray" floodlights are represented by the "Brentford," "Oxford," and "Milford" units.

A Runbaken hand grinder

Henry Simon, Ltd. (D. 611)

In a wide range of products of this company and those of its associates, Turbine Gears, Ltd., and W. S. Barron & Son, Ltd., the main exhibit will be a new and improved design of four-roller mill for flour milling, among the outstanding features of which is a satellite gear drive giving constant tooth mesh no matter whether the rolls are open or closed, or to what degree they are adjusted. Accessibility is the keynote of the design of the new "Speight Plansifter." In an automatic bin control unit one section demonstrates the "Reform" system of sequence filling and discharging of bins, while the other section demonstrates the period control of batch feed by electro-magnetic means. The dischargings are electro-magnetically recorded. The "Simon" spray-type vertical mixer will also be seen.

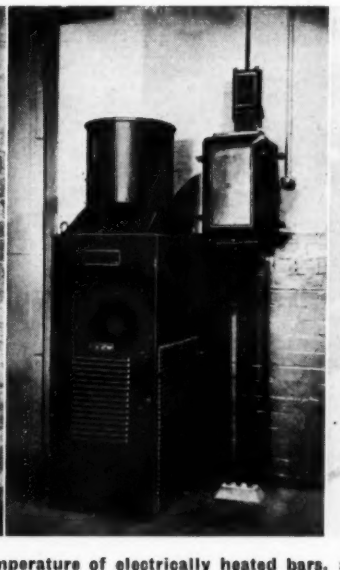
Turbine Gears, Ltd., will exhibit a large gear unit which transmits 300 h.p., reducing from 490 to 60 r.p.m., while W. S. Barron & Son, Ltd., will show examples of grinding machinery, including an "Impact" grinder with built-in motor and a "Dreadnought" grinder for limestone, oats, maize, barley, etc.

Simplex Electric Co., Ltd. (Cb. 414/515)

The complete range of "Creda" cookers shown will meet all domestic requirements: parts are standardised and interchangeable for easy replacement. Notable among a large selection of the company's fires, which number over three dozen, will be the "Peerless," a modern reflector type with a hearth glow effect, and the "Magpie," a low-priced portable model (illus.) with highly polished finish. Another convenient form of electric heating is represented by "Creda-Vulcan" tubular heaters, which are particularly suitable for schools, churches, offices, and similar buildings.

"Creda" water heaters, both automatic and immersion types, will be prominently displayed, and there will be a comprehensive selection of other domestic appliances, such as irons, kettles, toasters, wash boilers and warming plates.

The Simplex "Magpie" fire



Radiovisor equipment controlling the temperature of electrically heated bars, a Westinghouse rectifier for cinema arcs and a Ferranti moving-coil regulator showing an astatic voltage relay

On the heavy industrial side will be shown the well-known Simplex conduits, together with a comprehensive range of conduit fittings, switch and fuse gear. Since the last Fair several new cooker control units and a new range of lightweight 15-A 250-V ironclad distribution boards have been introduced. Industrial lighting equipment and special flameproof lighting apparatus for inflammable atmospheres will be of special interest, while among street-lighting equipment, both for filament and mercury-discharge lamps, will be representative lanterns, brackets, and poles.

Smith Meters, Ltd. (Cb. 202/303)

The single lamination construction of the core ensures permanent accuracy and reliability of this company's meters, a complete range of which will include a new two-part tariff prepayment meter.

Stewarts and Lloyds, Ltd. (D. 500/601)

Among a range of products which extends from pig iron to large-size mild steel pipes will be screwed and socketed tubes and fittings of gas, steam, galvanised and water quality, from ¼in. to 54in. bore. Attention is drawn to the variety of joints shown (many of them sectioned), and engineers who have had trouble with corrosion will find the samples of protective coverings of interest.

A selection will be given of brass and gunmetal valves and fittings, steel and heat-resisting iron castings, steel sections, and foundry and forge pig irons.

J. B. Stone & Co., Ltd. (D. 302)

This company's nibbling machines are used extensively throughout the engineering trades and in the aircraft industry. They are made in three sizes: No. 0, which is a bench-type machine and cuts mild steel from 1/32in. to 3/32in. thick; and Nos. 1 and 2, which are supplied with stands, the former cutting mild steel from 1/16in. to 3/16in., or stainless steel 1/32in. to 3/32in. thick, and the larger machine, cutting mild steel from ¼in. to 5/16in. thick or stainless steel 3/32in. to ¼in. The machines are particularly useful for cutting irregular shapes in sheet metal where the quantity needed does not justify the making of press tools.

Streetly Manufacturing Co., Ltd. (Cb. 204)

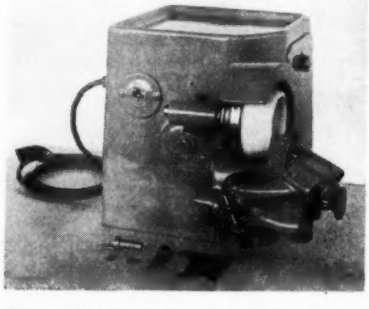
Mouldings in "Beetle," bakelite and "Scarab" will include meter cases, electrical fittings, lampshades, bowls, standard lamps, funnels for industrial use, extruded tubing and laminated sheet.

Taylor & Challen, Ltd. (D. 509)

In the double roll feed mechanism fitted to a 40-ton inclinable press to be seen in operation, all spindles are accurately ground, and the actuating ratchet is of friction type, to permit infinitesimal variations in the length of feed. Lifting gear is provided for the top rolls, for use with pilot punches. A notching press for stator rings of electric motors also shown is specially designed for internal notching at high speed. The flywheel is of the combined key and friction type, which gives positive action to the engagement and disengagement of the clutch, but prevents the shock of starting at high speed from putting undue strain on the press parts. Outstanding features are the great depth of throat, allowing rings of large external diameter to be notched; also the large table, on which notching attachments for various diameters can be fitted.

Taylor, Taylor & Hobson, Ltd. (D. 708/809)

Besides a workshop projector with lenses covering large fields, and the company's well-known pantograph engraving machines of various sizes, for engraving lettering and designs on metal, wood, vulcanite, etc., a new type of cutter grinder (illustrated) will be exhibited, along with electric etching devices and machinery, including the



Type "D" cutter grinder (Taylor, Taylor & Hobson)

"Multiple Javelin" etcher used for marking engine components, after hardening, with names, prices, &c.

Tecalemit, Ltd. (D. 414/515)

In a comprehensive range of lubricating equipment and accessories the principal newcomer will be the "Multipoint" lubrication battery, which has been developed for continuous lubrication of heavy-duty plant such as rolling mills, stone crushers, etc. It consists of a number of oil-operated cylinders with dial gauges indicating working pressures of individual delivery lines, oil being delivered to cylinders *via* a "Brentford" pump operated by electric motor. Grease, supplied to the cylinders by separate pump, is thus forced to bearings. There will also be central lubrication pumps, car lifts, car washer, air compressors, grease gun systems, forced feed oil cans, and mechanical lubrication systems.

Telegraph Construction & Maintenance Co., Ltd. (Cb. 503)

Submarine telegraph and telephone cables will include "Paragutta" and "K Gutta Telconax" products. In a special radio relay cable, consisting of aerial wire and multicore cables of low capacity, high insulation and negligible cross talk, the insulation and sheathing used is "Telconax," which is extremely resistant to moisture and chemical attack, has excellent ageing properties, and is exceptionally light and clean to handle. High frequency cables are made for rejectorstat and antistatic aerial systems, short wave dipoles and television leads and inter-connections between photo-cells, amplifiers, &c.

Samples and sections of paper-insulated lead-covered and armoured power cables will include types for pressures up to 11 kV.

Among "Telcon" gutta percha goods visitors will see acid and alkali resisting ware, packings for cold water systems, and gutta percha-backed paper.

"Telcon" metals represented will be "Mumetal," "Radiometal," "2129" alloy and "Rhometal" (metals with high magnetic permeability and low electrical losses), and "Calomic" and "Pyromic" (heat-resisting alloys with high electrical resistances).

Timmis & Co., Ltd. (Cb. 803/902)

The chief general characteristic of this company's firebricks is their high density with consequent high resistance to slag or fuel ash attack, while the adequate and even burning which they receive makes them thoroughly sound without being vitrified or overburnt. Cold setting furnace cements for jointing, pointing, or painting brickwork or for ramming or repairing small furnaces are also of interest.

Tube Products, Ltd. (D. 615)

Large quantities of electrically welded steel tube will be exhibited, both in straight lengths and manipulated, in sizes from ⅜in. to 3½in. outside diameter in gauges from 22 to 6 s.w.g., according to diameter. Certain sizes are available in stainless steel.

Tuscan Engineering Co. (Cb. 922)

A feature of this company's range of 3-phase induction, single-phase r.i. and d.c. motors (up to 5 h.p.) is that motors

Standard Tuscan ¾-h.p. motor

of corresponding h.p. are interchangeable. A ¾-h.p. model is illustrated.

United Steel Coys., Ltd. (D. 612/713)

A selection of films will demonstrate some of the processes in the manufacture of certain products, such as the mining of hematite ore at the companies' Beckermet (Cumberland) mines, the making of acid Bessemer steel rails and the manufacture of "Diamet" inspected

A further selection of washing equipment: The "Servis Model F" washer (Wilkins & Mitchell), a new "Uno" machine (Universal Boilers & Engineering Co.), the Revo "Superwash" wash boiler and the "Locomotive" machine (West Lancashire Refrigeration Co.)

alloy steels in the high-frequency electric steel melting shop and rolling mills of Samuel Fox and Co., Ltd. Specimens of their manfactures will be shown by the following companies which form the group: Appleby-Frodingham Steel Co., Ltd. (constructional steelwork section and Frodingham-Hoesch steel sheet piling); Steel, Peech and Tozer (railway materials and heavy forgings); United Strip and Bar Mills ("Stribar" reinforcement); S. Fox and Co., Ltd. (road vehicle springs and alloy steels including "Diamet" steel and "Durehete" creep-resisting steel, which has been specially designed to meet the demands of the power station and boiler house engineer); Workington Iron and Steel Co. (West Coast hematite iron, including "Uco," machine cast pig iron; and rails treated by the Sandberg regulated sorbitic and oven-treated process); Thos. Butlin and Co. (civil engineers' castings and precast concrete products).

Universal Boilers & Engineering Co., Ltd. (Cb. 703)

Among a range of about thirty "Uno" washing machines and wash boilers will be a neat washer (illus. p. 250) which folds up into a handsome kitchen table. It has a loading of 4 kW and is scarcely audible when in operation. Independent control is provided for wringer, heater and agitator. The latest wash boiler (illus. p. 245) has a die-cast aluminium top with a chromium-plated lid. All the feet are galvanised, and the casing is enamelled inside and out. Double thickness mica insulation is employed and the taps are full ¾-in. bore.

Vacuum Oil Co., Ltd. (D. 427)

Prominent in the main display will be a complete range of "Gargoyle" lubricating oils and greases. A working exhibit of the "Delvac" mechanical lubricator will also be seen among a number of important units using "Gargoyle" lubricants.

Van Dorn Electric Tools (Cb. 923)

Among this company's portable tools will be "Junior" drills, 6- and 7-in. bench grinders and a new 7-in. light duty sander. There will also be standard and heavy-duty drills, screwdrivers and tappers, portable grinders

A Van Dorn die grinder

(illus.), polishers, valve refacers and various accessories.

Versil, Ltd. (Cb. 818)

For the insulation of boilers, cylinders, tanks and similar vessels, "Versil" glass silk is made in flexible blankets approximately 10 ft. by 3 ft. in any thickness from ¼ in. up to 3 in., or more if required. These blankets are specially backed on each side to facilitate handling, and sewn with asbestos yarn. Rigid sections are also made for fixing by means of metal straps. "Versil" has a very low coefficient of thermal conductivity; *e.g.*, at 200 degrees F. the thermal conductivity is 0.023 B.T.U. per sq. ft. per hour per deg. F. per foot compared with 0.035 for magnesia. It is light, strong, flexible and capable of withstanding fluctuations of temperature and excessive vibration without cracking or disintegration. It is also non-inflammable and non-corrosive.

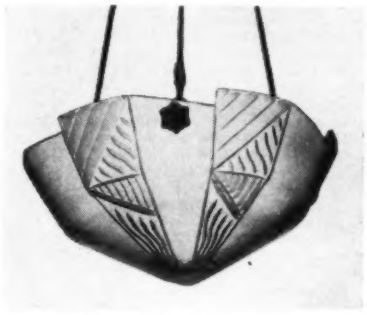
In addition to being used as an insulator of heat, "Versil" has other applications such as the construction of battery plates, air filters and acoustic insulation.

H. W. Ward & Co., Ltd. (D. 415)

On this stand will be seen a complete range of tools, toolholders, chucks and accessories for use on capstan and turret lathes.

Webb's Crystal Glass Co., Ltd. (Cb. 613)

This company specialises in the manufacture of exclusive designs of globes and reflectors for electric lighting fitting manufacturers. Exhibits will include mainly three-ply opal globes of extremely low light absorption (approxi-



A glassware pendant by H. G. Richardson & Sons, Ltd., to be shown on the stand of Webb's Crystal Glass Co.

mately 6%) and high-efficiency reflectors, in clear glass, with the surface wholly, or partly, silvered and backed with electrolytically deposited metals by the Duro-Ray process. Various examples of globes for aerodrome lighting, large reflectors for floodlighting purposes, and directional type reflectors for street lighting purposes will also be on view. The associated company, Henry G. Richardson and Sons, Ltd., will also be showing bowl units (illus.), glassware and lighting fittings of all kinds.

West Lancashire Refrigeration Co., Ltd. (B. 814/913)

A 650-W built-in circulating-type water heater is a feature of the "Locomotive" electric washing machine, which is being handled by this company on behalf of its Canadian manufacturers, the Brantford Washing Machine Co., Ltd. Both the models shown, the D.H.25 (illus. p. 250) and the "super de-luxe" S.D.H.30, are fitted with "no-wear" water agitators and have a safety-type multi-position wringer with automatic pressure release extending the full width, and large balloon-type rollers. The cheaper model is finished in ivory and chromium, while a touch of green has been introduced in S.D.H.30, which is streamlined and incorporates an automatic draining board.

Westinghouse Brake & Signal Co., Ltd. (Cb. 614/616)

An important application of metal rectifiers is the equipment for feeding cinema projector arcs (illus. p. 249). A complete power unit developed for operating the arcs direct from the a.c. mains entirely dispenses with ballast resistances, and includes a new constant current ballasting circuit which gives the plant an extremely high efficiency. This is said to reduce the power consumption of the plant as a whole to about one half of that of other systems. A type "Twin 45/60" equipment will be seen in operation.

Rapid advances have been made in the design of rectifiers for electro-plating, especially as regards current control. In the larger sets this control is effected by means of an auto-transformer, giving no fewer than sixty-four different outputs. Twelve or sixteen different outputs are obtainable with the smaller equipment. A new duct has made the equipments more compact.

The popularity of metal rectifiers for charging electric vehicle batteries is due to their ease of operation, lack of maintenance, and reliability. Chargers for battery service stations and metal rectifiers suitable for change-over and general industrial work will also be exhibited, with demonstrations of typical applications, while the uses of the metal rectifier in broadcasting, cable testing, etc., and actual installations of plating rectifiers, vehicle chargers, etc., will be illustrated by photographs.

Wild-Barfield Electric Furnaces, Ltd. (Cb. 302/403)

Typical electric furnaces from small laboratory muffles up to industrial equipments for high-speed steel hardening, carburising, &c., will be shown in operation. Two furnaces with "heavy-hairpin" heating elements, one a horizontal box type and the other a vertical furnace, will be shown for the first time, together with two vertical forced air circulation furnaces fitted with patent centrifugal fans giving rapid air circulation even with a dense charge. One of these latter furnaces is for tool-room and experimental use, while the other is a larger production model fitted with a charge progress recorder for controlling and recording the furnace temperature.

Two electro-magnetic hardening furnaces give excellent results for hardening carbon and low-alloy steels, as they determine exactly the non-magnetic point for the steel, which is the correct instant for quenching. Many small muffle furnaces will include vertical and horizontal types, together with tube furnaces for combustions, thermo-couple checking, &c.

High-speed steel hardening plant (illus. p. 242) will be represented by a small equipment for general tool hardening and a larger equipment consisting of two entirely separate units. Both the high-temperature and preheating furnaces of the latter are fitted with automatic temperature control and with a "Counterscale Curtain" for providing positive control of the furnace atmosphere, which enables scale-free hardening to be carried out. The company acts as distributor for the Vickers "Pyramid" hardness testing machine.

Working models will illustrate the principles of forced air circulation and there will be photographs of various installations carried out by the company and the associated G.W.B. Electric Furnaces, Ltd. (See page 243.)

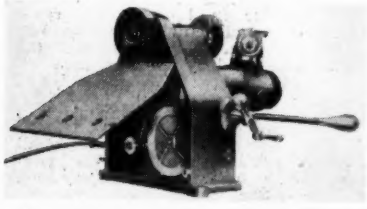
Wilkins & Mitchell (Cb. 719)

A new cabinet model "F" "Servis" washing machine (illus. p. 250) has several improvements over the "E" type. The wringer has 20 per cent. increased pressure on the rollers, and improved wringer gearing gives easier control and longer life. The finish has been improved, a baked-on synthetic enamel now being used. The wringer guards are constructed of vitreous enamelled "Armco" iron, and will keep their new finish indefinitely. The tub, splash skirt (which also forms the top of the cabinet) and the tub lid are also finished in the same way, while a baked-on synthetic enamel is now used for the cabinet body. A vitreous enamelled table top can be supplied as an extra. A special guide has been fixed to facilitate sliding the wringer into its cupboard when not in use. The rubber-mounted motor has

The "Nixin" lampholder (Walter Johns), British Sangamo "S.S." time switch and "Ureset" fuse (Worsdall Mercury Controls)

been specially designed by Crompton Parkinson, Ltd.

S. Wolf & Co., Ltd. (Cb. 310)
A comprehensive range of electric tools will include machines for drilling, grinding, polishing, filing, burnishing, decarbonising, sanding, screwdriving and nutsetting. There will also be an industrial blower and vacuum cleaner and engine reconditioning equipment. Additions to the "Wolf" range to be shown for the first time are a ⅜-in. valve refacer (illus.) and a 6-in. portable electric hand grinder.



The Wolf "V.R.4" ⅜-in. valve refacer

Worsdall Mercury Controls, Ltd. (Cb. 229)
In the "Ureset" resetable mercury fuse (illus. page 251) the element is completely encased in a bakelite moulding, and when in position no contacts are exposed. The fuse, which may be instantly reset many hundreds of times, is claimed to be flameproof (there being no exposed flash) and far safer than other types. It cannot be reset against a permanent overload. It can be supplied in 5, 10 and 15-A, 250-V ratings. Domestic distribution boxes, with or without "Master Button" resetting, together with fuse bases for industrial applications are also on show.

Wolseley Sheep Shearing Machine Co., Ltd. (D. 905)
Among a range of shearing and cattle clipping machines will be the "Clipkit" electric horse and cattle clipping machine (illus). An all-electric cream separator, which is of 110 gal. per hour capacity, is gearless, and is driven by a "V" rope from a pulley on the electric motor to the main shaft of the separator.

Wolseley "Clipkit" horse and cattle clipping machine

The London Exhibits

Air-Glow Lights, Ltd. (K. 1336)
"Air-glow" illuminated tubular lettering, containing moving bubbles, forms the basis of this exhibit.

Aladdin Industries, Ltd. (F. 766)
Lamp shades, table lamps, floor standards and reading lamps will be shown, together with examples of art pottery lamps.

Allen & Hanburys, Ltd. (A. 152)
Exhibits will include the "Wigmore" electrically heated instrument steriliser in stainless steel and fitted with a safety cut-out among a complete range of sterilisers.

H. E. Ashdown, Ltd. (F. 702)
This stand will be made up of glass showcases exhibiting a complete range of moulded switch-boxes, electric clock cases, motor car electrical accessories, battery terminal nuts, fuse-boxes and bridges and other electrical wiring accessories.

Baird Television, Ltd. (G. 934)
On this stand will be displayed the "Televisor" receiving set (illus. page 253). It gives a picture area which is claimed to be 50 per cent. greater than other television receivers now on the market. The "Cathovisor" cathode-ray tubes have 15 in. diameter screens, giving a picture size 12 in. by 9 in. Demonstrations of actual television reception will be given, and educational equipment will also be shown to demonstrate the principles of both television transmission and reception.

Bakelite, Ltd. (F. 703)
Synthetic resin products of all kinds will be shown, together with moulding materials, varnishes, lacquers, and silent gear material, etc.

C. Baker (A. 148)
Types of microscopes and instruments as applied to medical, public health and industrial purposes will be on view. Also the epidiascope, which removes the necessity for making lantern slides. The picture is placed without any previous preparation in the epidiascope, and it is projected on to a screen in natural colours. The introscope is used for examining internal surfaces, such as oxygen bottles, ship's propeller shaftings, etc.

R. J. Beck, Ltd. (A. 138)
This exhibit will consist of a complete range of microscopes, spectroscopes and projection apparatus.

Belgrave Electric Co., Ltd. (F. 725 and White City 1718)
Wrought ironwork, pottery and table lamps, lighting fittings, electric clocks and candle lamp fittings will be shown on this stand, together with Coronation pottery table lamps and clock-lamps.

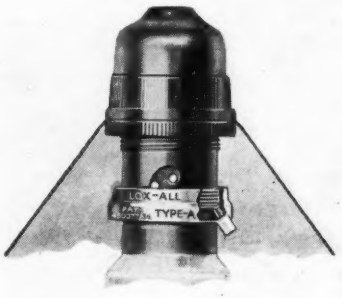
Bellingham & Stanley, Ltd. (A. 52)
Special adaptations of the sodium and mercury discharge lamps as applied to spectrometric apparatus and polarimeters are being exhibited. The Donaldson colorimeter should be of interest to illuminating engineers.

British Electric Domestic Appliances, Ltd. (H. 1015)
All the domestic vacuum cleaners and washing machines shown at the Birmingham Section of the Fair will be displayed at Olympia.

British Plastics Federation, Ltd. (F.707)
The Department of Overseas Trade has entrusted to the Federation the organisation of the Plastics Section, and the stand will be an open one and available as an information bureau.

British Vacuum Cleaner & Engineering Co., Ltd. (H. 1006)
Vacuum cleaners and a washer similar to those in the Birmingham section will be exhibited.

J. A. Brook, Ltd. (D. 504)
The "Lox-all" lamplock, applicable to all bayonet slot lampholders, is to be shown. A locking screw jack operates between the bottom of the lampholder and the swelling of the brass cap on the lamp.



The "Lox-all" lamplock in position

Bylock Electric, Ltd. (H. 1001)
New products among a range of vacuum cleaners and hair dryers include the "Triplex" vacuum cleaner and "Simoom" hair dryer. The former has a 6½-in. diameter cylinder, a ¼-h.p. motor fitted with three fans, a built-in switch, and a condenser to eliminate interference with radio. The "Simoom" hair dryer contains a motor switch and element switch, the air intake being at the rear of the machine, thereby eliminating any chance of hair being dragged into the machine. The casing is of brown mottled bakelite.

Cable and Wireless, Ltd. (A. 255)
A working demonstration will be given of automatic apparatus used for the transmission and reception of messages on beam wireless circuits.
Models of wireless transmitting and receiving stations will be shown illustrating two types of directional aerials.

E. K. Cole, Ltd. (F. 846)
See description of Birmingham exhibits.

Crayonne, Ltd. (F. 841)
This company will show lamp shades, table lamps, fittings and moulded products generally.

T. H. & J. Daniels, Ltd. (F. 849)
See description of Birmingham exhibits.

Thomas De La Rue & Co., Ltd. (F. 701)
The display is designed to give visitors a comprehensive view of the resources of the company's plant. Mouldings in all proved synthetic resin materials will be shown produced by direct pressure and the injection processes. Individual mouldings include radio cabinets, clock cases, hair dryers, telephones, fans, etc.

R. H. Dent, Ltd. (A. 29)
Manufacturers of the "Ardente" range of deaf aids, including electrical amplifying equipment. On the stand will be various types of public address apparatus, including the dynamic ribbon microphone.

Dernier & Hamlyn, Ltd. (F. 807)
This exhibit will consist of an entirely new range of lamp shades, in silk and other materials, a large selection of new lamps and shades and "Litlux" bed lights.

Dictograph Telephones, Ltd. (F. 711)
The company manufactures loudspeaking and interconnecting telephones for offices, works, &c. The "Dicto-Call" system of staff location is made in a silent form for hospitals, &c., and with bells, buzzers, gongs, chimes or hooters for other situations. A desk-type central control for the internal telephone system contains a number of calling keys, each with a signal lamp and low-toned buzzer.

Dominion Electrical Co. (K. 1332)
"Lite-on" signs will be exhibited, together with striplighting, floodlights, and invisible-ray illuminated signs treated with patent chemicals.

J. J. Eastick & Sons (G. 943)
"Elex" short-wave convertors, adaptable to all types of British radio receivers, radio accessories, &c., are shown.

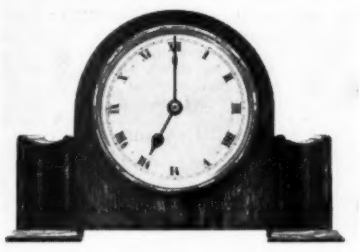
Ebonestos Industries, Ltd. (F. 700)
The stand will contain a large number

A Bylock vacuum cleaner without accessories

of mouldings of interest to the electrical trade, including Ebonestos plastic compositions.

Electric Art Shades (1928), Ltd. (F. 781)
Besides a variety of designs of table standards, and an entirely new range of shades, this year's speciality will be a range of Coronation lampshades of various types.

F. W. Elliott, Ltd. (E. 627)
A number of electric timepieces will be shown, of both the striking and chiming type, in small ornamental cases in onyx and chrome, fancy woods, sycamore, macassar and figured walnut, in addition to granddaughter clocks in fancy wood with electric movements.



An Elliot electric clock

Garrard Clocks, Ltd. (E. 638)
All kinds of electric clocks are made, ranging from the boudoir type to chiming and striking models in a wide variety of cases.

range of current models, including the "Junior."

F. A. Hughes & Co., Ltd. (F. 843)
The company manufactures moulding powder, and apart from three main quality grades of "Rockite" thermo-setting synthetic moulding compounds a large range of powders for more highly specialised uses is available.

Another moulding material is "Cellumold," a thermo-plastic cellulose acetate compound used extensively for moulding by the injection process in the production of varied small intricate parts. A further use for this material is an outdoor sealing bell for 33,000 V. single core, 0.2 sq. in. "H" type cable with moulded "Cellomold" reinforcement.

Ideal Home Electrical Appliances, Ltd. (A. 53)
The apparatus on view will include medical appliances, portable violet-ray high-frequency vitalators and ozonisers, violet-ray rejuvenators, radiant light and heat apparatus.

Imperial Chemical Industries, Ltd. (A. 170/174)
This company's general stand in the chemical section includes electrical equipment.

Iniection Moulders, Ltd. (F. 848)
This will be a display of goods that have been made by the injection moulding process. In the main these comprise bobbins, valve stands, cross feeder insulators, etc., and are produced from thermoplastic materials such as cellulose acetate, trolitul, etc.

Insulators, Ltd. (F. 845)
Precision mouldings in phenol and urea material will comprise the bulk of the exhibits on this stand.

apparatus, silver solders, "Staybrite" steel gauze and precious metal contacts for electrical purposes.

Kent Mouldings (F. 704)
Exhibits will include moulded junction sealing chambers and cable terminals for multi-way telephone cables, telephone parts, switch and fuse block covers, terminal strips, insulators, bobbins for various types of coils, radio valve holders and bases, escutcheons for tuning dials, control knobs, tubular condenser cases and caps, etc.

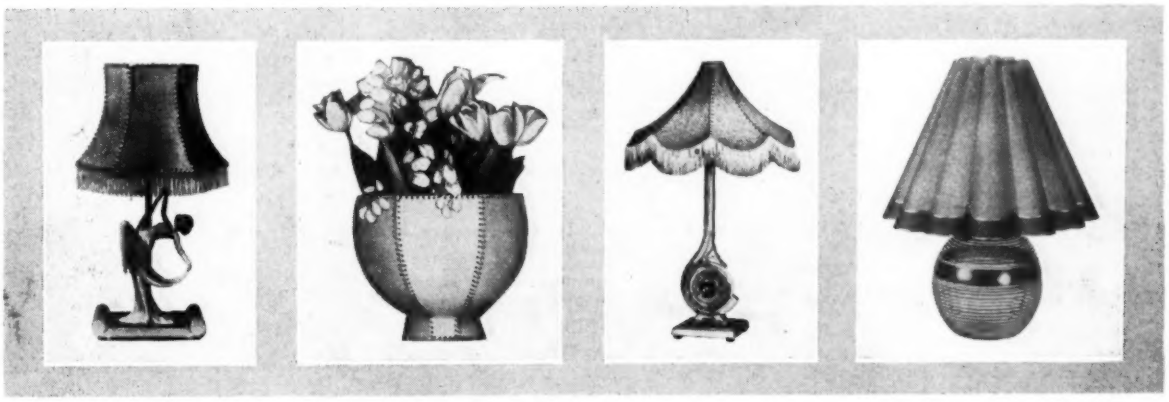
K.F.M. Engineering Co., Ltd. (K. 1348)
This company will show electric signs and illuminated clocks as well as the "Internalite" internally illuminated glass signs.

Kitchendom, Ltd. (White City 1706)
See description of Birmingham exhibits.

Knightshades, Ltd. (F. 826)
In addition to the company's standard range of lampshades, table lamps, floor standards and bedlights a speciality will be Coronation designs and decorations. These will include a series of shades in the form of a crown, and also as a flower bracket or bowl. Included amongst the range of metal table standards are models with the new anodised aluminium finish.

London Electric Clock Co. (E. 605)
Electric clocks and movements will appear in this company's display.

W. Lusty & Sons, Ltd. (F. 790)
A comprehensive range of lamps will



New table standards by Electric Art Shades, Knightshades, Ltd., Walker Fender Co., Ltd., and Waite & Son, Ltd.

General Chemical & Pharmaceutical Co., Ltd. (A.191)
On this stand will be found "Oasis" accumulator acid and distilled water, and potash electrolyte for nickel iron batteries.

General Mouldings Co., Ltd. (F. 842)
Manufactures include mouldings in phenol and urea materials for all trades, and mouldings in high insulation material.

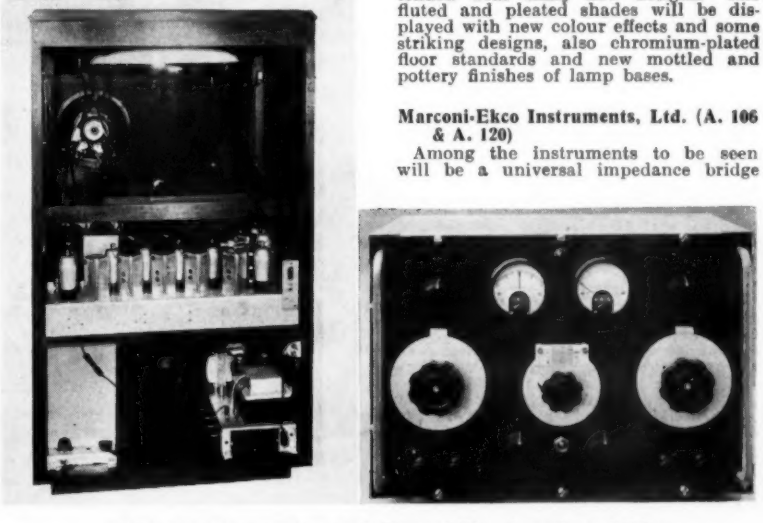
D. Gestetner, Ltd. (F. 714)
Hand and electric duplicators will be shown, including a "precision inking" duplicator employing an entirely new method of ink application, utilising special ink cartridges.

F. C. Heayberd & Co. (G. 936)
See description of Birmingham exhibits.

Hanovia, Ltd. (A. 108)
This company will exhibit ultra-violet mercury arc lamps, "Alpine Sun" and "Kromayer" medical lamps, "Sollux" luminous infra-red lamps. "Home Sun" and "Solarium" indoor sunbathing lamps, technical lamps for fluorescence, durability, vitamin-activation and sterilisation.

Hoover, Ltd. (H. 1110)
Some of the actual machinery used in the company's test laboratories will be seen determining quality.
In addition there will be a complete

Johnson Matthey & Co., Ltd. (D. 565)
Exhibits will include various alloys and a selection of products for industrial purposes, such as platinum laboratory



Baird television receiver and Marconi-Ekco impedance bridge

be displayed with shades of buckram, linnette, parchment, laminated parchment, and various trimmings, including wool, silk, chenille, etc. The range of double shadow style shades has been extended with many new designs. The fluted and pleated shades will be displayed with new colour effects and some striking designs, also chromium-plated floor standards and new mottled and pottery finishes of lamp bases.

Marconi-Ekco Instruments, Ltd. (A. 106 & A. 120)
Among the instruments to be seen will be a universal impedance bridge

(illus.), an inductance comparison bridge, gang condenser test bridges, an inductance test bridge, a short-circuited turns tester, a valve voltmeter, a circuit magnification meter, a beat frequency oscillator and signal generators of various descriptions. There will also be electro-medical apparatus for radio-thermy and diathermy.

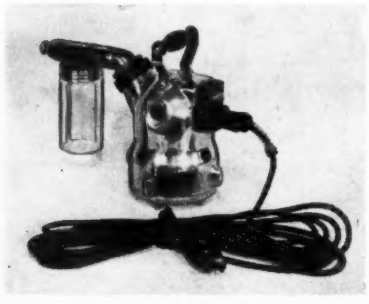
Mayfair Shades, Ltd. (F. 827)
There will be a new range of electric lamp shades featuring many exclusive materials which will be shown for the first time, together with a display of about fifty new china and pottery table lamps. Coronation illuminations will also be displayed.

Mouldrite, Ltd. (F. 705)
Thermo-setting phenolic and urea-type synthetic resins will be shown, moulding materials, bases for lacquers, cements, laminated veneers, rods, sheets and tubes and thermo-plastics.

Multitone Electric Co., Ltd. (G. 926)
Deaf-aid radio sets will be exhibited, including a miniature three-valve amplifier, the "Reactor." In common with other "Multitone" amplifiers it includes "unmasked hearing," that is, the elimination of the masking of the high frequencies at high intensity levels.

New Radiant, Ltd. (H. 1005)
Exhibits will include "Radiant" Coronation window signs, &c.

New Welbeck, Ltd. (H. 1005)
This company will exhibit its canister-type vacuum cleaner fitted with a



The "New Welbeck" motor and sprayer

B.T.H. motor, which is detachable and can be used as a sprayer. For carpet cleaning there is a retractable rotary brush and a patent tool rack surrounds the canister.

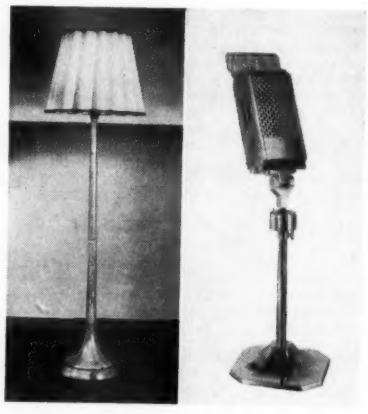
Norma Technical Products, Ltd. (E. 606)
An electrically operated razor known as the "Telerazor" will be shown on this stand. It is operated by a small battery, the blade being made to vibrate at a high frequency. It is watertight and rust-proof, switching being accomplished by turning a milled nut at the end of the handle.

Philco Radio & Television Corporation of Great Britain, Ltd. (G. 938)
A complete range of all-mains and battery radio receivers will be shown, including all-wave models and car radio receivers.

J. Redfern, Ltd. (H. 1003)
The "Little Wonder" electric brush machine will be shown.

Schick Dry Shaver (A. 109a)
The Schick dry shaver is an electrically operated instrument used without soap, water, brush or blade. It consists of a unit embodying an inner and outer cutter driven by a motor. The slots act as a comb which picks up the hairs and guides them into the cutting slots. The inner cutter, driven by the motor at a speed of 7,200 cuts a minute, shears off the hairs.

Smiths English Clocks, Ltd. (E. 639)
A stand devoted to electric clocks will contain a new range of clocks embodying the new low-priced "Bijou" movement. This movement is fitted to the "Perth," with a moulded dial, the "Durban," a wall model for kitchen and bathroom use, and the "Dulwich," a neat, moulded wall clock. The "Clare" is a new chrome and strut



A 20th Century fluted floor standard and an "Ardente" microphone for public address

model, and the standard range is being considerably extended to meet a demand for chrome and coloured glass models. New illuminated alarm clocks will also be exhibited.

I. & M. Steiner, Ltd. (G. 909)
Electric table lamps and fancy electrical goods will be shown.

Synchrophone (1936) Co. (G. 939)
Exhibits will include gramophones and pick-up recording equipment and mouldings, as well as home recorders.

Synplas, Ltd. (F. 844)
The exhibits will be comprised mainly of plastic mouldings for electrical components, clocks, motor ignition replacement parts, etc.

Thermega, Ltd. (A. 119)
This year's exhibit will contain the usual household appliances such as heating pads and blankets, the company's standard medical gear, including electric helmets, capes, ambulance blankets, &c. In addition to the usual motor-car equipment an electrically heated foot-muff has been developed.

Tintometer, Ltd. (A. 79)
Colour measuring equipment, which should be of interest to those engaged in the production of moulded materials, will be shown; also apparatus for the determination of pH of liquids.

Twentieth Century Electrical (F. 793)
This company's products are lighting fittings and shades in cellulose, acetate and kindred materials, chromium table and floor lamps, and "Sunray" and "Rippleray" shades. A new product is the "Atlantic" model in a heavy vegetable parchment which is practically indestructible and easily cleaned.

Vactric, Ltd. (H. 1008)
The company's full range of vacuum cleaners will be on view, and this includes models ranging upwards from the low-priced hand cleaner and "Popular" cylindrical type to the "Airflo" bag model with headlight, automatic nozzle height adjustment and motor-driven brush.

Vulcanised Fibre, Ltd. (F. 708)
"Castle" vulcanised fibre in sheets, rods and tubes is shown, also all types of mechanical components manufactured therefrom, in addition to examples of vulcanised fibre containers.

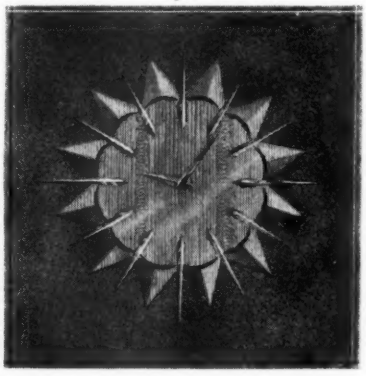
Waite & Son, Ltd. (F. 770)
A number of new lighting fittings will be shown on this stand, as well as table standards in wood, chromium, pottery and glass, floor standards and ceiling fittings in wood, chromium and glass, &c.

Walker Fender Co., Ltd. (White City 1918)
Apart from the company's standard range of chromium table standards, such novelties as clock lamps, a floor standard combined with a clock, a table lamp-cum-barometer and a floor standard with a small circular table half-way up the stem will be seen.

T. Webb & Sons (D. 522)
An associate of Webb's Crystal Glass Co., this company will show domestic and table glassware, including cut-crystal glass table lamps.

Wedekind & Co. (K. 1339a)
Electrical advertising display cabinets will be included amongst the exhibits.

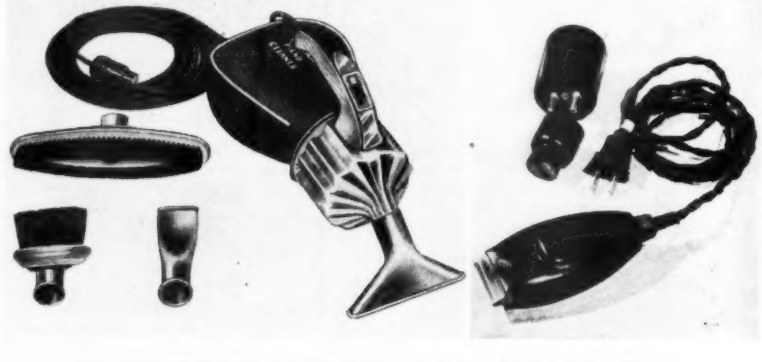
Woodfyt Sales, Ltd. (White City 1714)
The new "Triad" series of lighting fittings and clocks is made in sycamore and decorated with coloured enamels and silver.



A "Triad" fitting shown by Woodfyt Sales, Ltd.

Wright & Weaire, Ltd. (A. 81)
The exhibits on this stand will include "Wearite" standard instruments for testing radio receivers and measuring voltage, current, resistance, inductance, capacity, wave form as well as frequency.

J. Wludarte & Co., Ltd. (F. 732)
Hand-painted unbreakable table lamps in various designs are to be shown on this stand in conjunction with an associated company, R. W. Foote, Ltd., together with Mickey Mouse lamps and shades.



The "Vactric" hand suction cleaner and the "Schick" dry shaver

Birmingham Electrical Committee and Functions

IN our introductory notes we have referred to the active part played by Mr. T. R. Martin in connection with the electrical side of the Birmingham Section of the Fair. He is chairman of the Electrical Advisory Committee which is responsible for the organisation of the Electrical Section at Castle Bromwich.

The other members of the Committee are representative of all branches of the industry and include the presidents and chairmen of the principal associations. They are as follows :—

Mr. A. Albrecht, director and secretary of the Electrical Wholesalers' Federation.
Mr. A. G. Batt, chairman of the B.E.A.M.A. Heating and Cooking Section.
Mr. H. H. Berry.
Mr. J. R. Cowie, president of the Association of Mining Electrical Engineers.
Mr. A. C. Cramb, director and secretary of the British Electrical Development Association.
Mr. H. M. Drake, president of the Electrical Contractors' Association.
Mr. F. Forrest, president of the Incorporated Municipal Electrical Association.
Mr. H. M. Fulton, president of the Electrical Contractors' Association of Scotland.
Lieut.-Col. W. J. Kent, Electrical Porcelain Manufacturers' Association.
Dr. A. H. Railing, General Electric Co., Ltd.
Mr. C. W. Sully, director of the Electric Lamp Manufacturers' Association.
Mr. V. Watlington, director of the British Electrical and Allied Manufacturers' Association.
Mr. H. T. Young, president of the Institution of Electrical Engineers.

The Electrical Advisory Committee has made the following arrangements for official visits to the Birmingham Section by various associations connected with the electrical industry :—

Tuesday, February 16th.—Luncheon.
Institution of Electrical Engineers (Council).
Incorporated Municipal Electrical Association (Council).
British Electrical Development Association, Inc. (Council).
Incorporated Association of Electric Power Companies.
Provincial Electric Supply Association.
London Electricity Supply Association.
Illuminating Engineering Society.
Electrical Contractors' Association of Scotland.
Electrical Contractors' Association, Inc. (Provincial).
Electrical Wholesalers' Federation (Provincial).
British Electrical and Allied Manufacturers' Association (Council).
Speaker : Mr. H. G. Williams, M.P., executive director of the Incorporated Association of Electric Power Companies.

Thursday, February 18th.—Tea.
Electrical Association for Women (Birmingham & Midlands Branch).

Friday, February 19th.—Luncheon.
Association of Mining Electrical Engineers.

Saturday, February 20th.—Luncheon.
Electrical Power Engineers' Association.
Electrical Association for Women (Demonstrators' Circles).
Speaker : Mr. F. Forrest, president, I.M.E.A.

Tea.
Students' Section of the South Midland Centre of the Institution of Electrical Engineers.

Tuesday, February 23rd.—Luncheon.
Institution of Electrical Engineers (South Midland Centre).
Incorporated Municipal Electrical Association (Provincial Centres).
British Electrical Development Association (Provincial).
Association of Supervising Electrical Engineers.
Association of Steel Conduit Manufacturers.
Association of Consulting Engineers, Inc.
Municipal Tramways and Transport Association, Inc.
Tramways, Light Railways and Transport Association.
Electrical Contractors' Association, Inc. (Council).
Electrical Wholesalers' Federation (Council).
Speaker : Mr. H. M. Drake, president, E.C.A.

Industrial Research

THE annual report of the Department of Scientific and Industrial Research for the year 1935-36 (Cmd. 5350, H.M. Stationery Office, 3s. net) draws attention to the change of outlook which is favouring co-operative team-work in preference to sporadic effort. For instance, the last five years have witnessed, the report states, the fruition of the policy adopted by several large industrial undertakings of setting well-balanced teams of research workers to solve a particular problem, or to develop a new product. This method of attack has led to the steady improvement of the efficiency of electric lamps, to the position this country has won in high-definition television, to the development on a commercial scale of the huge plant for the conversion of coal into oil by hydrogenation, to the growth of the plastics industry, and to many other important advances.

For this reason the Department attaches great importance to the development of the co-operative research associations. The sum which industry provided for their development in the last three years increased by 40 per cent. to £232,468. In the same period, the grants from the Department for these organisations increased to £107,451. New laboratories at Perivale, costing over £29,000, were erected by the Electrical Research Association.

In spite of such advances, the report still regards the research association movement as a whole as not yet entirely satisfactory. The Department would have been prepared to provide a further £66,000 in each of the past two years had industry been ready to provide an equivalent contribution.

A Radio Discovery

One of the results of the year was that radio research discovered three new electrified regions in the atmosphere between four and forty miles above the earth, well below the well-known Heaviside and Appleton regions. They are likely to be important in connection with the travel of very short waves, which are able to pass without reflection through the upper layers. Isolated trials at high frequencies, including those in use for television, have not yet indicated any frequency so high that its return from the middle atmosphere can be regarded as unusual. It is believed that local thunderstorms are a probable source for replenishing the electricity in the newly discovered layers.

In connection with radium treatment of diseases the strength of the radiations from a specially designed radium unit, with which various radium "skin distances" can be obtained, have been measured in a water "phantom," a celluloid vessel containing water and giving the same scattering and absorption effects as a human body. Means have been developed for accurately measuring and controlling tissue-dosage. Another investigation is in progress in connection with the weak radiations which may reach distant parts of a patient's body during treatment. The method used is to measure the electricity produced (ionisation) in air gaps in a laminated celluloid model of the body.

The improved apparatus for investigating artificial radioactivity is being used in a search for new radio elements of very short life whose existence is suspected, particularly those which occur in the human body.

Insulating Materials

At the Chemical Research Laboratories an improved electrical insulating material has been obtained by the blending of rubber derivatives with synthetic resins obtained from tar. These new materials are characterised by a high degree of elasticity. Milled rubber has been successfully chlorinated (liquid at minus 40 deg. C.) and incorporated with phenol formaldehyde, so furnishing a material superior in insulating properties to wood-meal phenol formaldehyde resin mouldings.

Work on ebonite done by the Research Association of British Rubber Manufacturers in collaboration with the Electrical Research Association, has made available, for the first time, data showing just what mechanical, electrical and chemical properties are to be expected from a product containing given proportions of rubber and sulphur vulcanised under given conditions. Efforts to minimise the tendency of ebonite to deform at high temperature have resulted in the development of a material possessing good resistance to heat without appreciable detriment to electrical characteristics.

Illumination

Work on the effects of glare on vision is proceeding, but the investigation of the merits of light of different colours (incandescent lamps and discharge tubes) for various purposes has been somewhat delayed by more urgent activities. The scheme for calculating the illumination required for any industrial process from knowledge of the various elements making up the visual task has been carried a stage further. A specification for tungsten filament lamps with blue glass bulbs to produce light partially corrected to daylight has been completed and work on colour matching units is in progress.

The British Colliery Owners' Research Association is collecting data about the life and efficiency of miners' lamp bulbs and the application of discharge tubes underground.

The British Launderers' Research Association is continuing its investigation of the rate of mixing of liquid and load in rotary washing machines. The electrical conductivity method has proved to be very successful.

In connection with food preservation an instrument has been patented for measuring the concentration of carbon dioxide and oxygen in the atmosphere of a gas store for fruit. It consists of a hot-wire meter with a null-point galvanometer and a calibrated slide wire.

In the Courts

Radio in Flats

IN a Divisional Court of King's Bench consisting of the Lord Chief Justice and Justices Swift and Goddard on February 2nd, a test case of The King *v.* Bull was heard on the appeal of the Postmaster-General from the decision of Mr. Ivan Snell, the Marylebone stipendiary magistrate, holding that twelve tenants of flats at Queen's Court and Princess Court, Bayswater, W., with loud speakers "plugged in" to a central wireless receiver were not liable to purchase wireless licences and dismissing the summonses issued against them under Section I, sub-section 3, of the Wireless Telegraphy Act, 1904, for "unlawfully working an apparatus for wireless telegraphy without a licence." It was said that the result of the appeal affected hundreds of occupants of blocks of flats in which loud speakers are provided.

The case for the P.M.G. was that as the tenants had the option of two stations by the use of a plug in the wall they were "working a wireless apparatus." On the other hand, it was contended on behalf of the respondent that a loud speaker was an "instrument" and not an "apparatus."

Mr. Snell in dismissing the summonses said that the critical words of the Act were "or working any apparatus for wireless telegraphy," and held that the word "working" must mean the tuning in required to receive the sounds sent out by the various stations. He agreed to state a special case for the consideration of the High Court.

The Solicitor-General in support of the appeal said that the respondent was the occupier of a flat in a large building belonging to New London Properties, Ltd., who had installed two receiving sets which were connected by wires to all the flats in the building. The occupants of the flats could receive the programmes on the National and Regional services by simply "plugging in" but that could only be done when they were correctly tuned in by the landlords. The short points were whether the loud speaker was an "apparatus" within the meaning of the Act and whether the movement of attaching the loud speaker to the plug was "working" the apparatus.

Mr. Bull was a gentleman of the highest integrity and the present proceedings reflected no discredit on him and arrangements had been made for Mr. Bull to be represented on the appeal by Counsel.

Mr. Maxwell Fyfe, K.C., having supported the decision of the magistrate on behalf of the respondent, Mr. Bull, the hearing of the appeal was adjourned.

On February 3rd at the conclusion of the arguments, the Lord Chief Justice, in giving judgment, said he thought the magistrate had come to an erroneous decision, and that what Mr. Bull did came within the meaning of the words "working an apparatus for wireless telegraphy" set out in the Section of the Act of 1904.

Mr. Justice Swift and Mr. Justice Goddard concurred and the appeal was accordingly allowed and the case remitted to the magistrate for him to deal with in accordance with the directions given by the Court.

Contractors' Claim for Overtime

Mr. S. R. C. Bosanquet, K.C., the Official Referee, on February 3rd delivered a considered judgment in an action brought by Messrs. Anderson, Angell & Co., Ltd., electrical contractors, London, E.C., to recover from Messrs. A. W. & R. B. Green, the lessees of the Regal Cinema, Highams Park, E., £105 which plaintiffs said they had incurred in expenses for overtime work in endeavouring to complete alterations to enable the cinema to be re-opened on September 29th, 1935.

The plaintiffs were the sub-contractors for the electrical work and their case was that the defendants ordered them to work overtime so as to enable the cinema to be opened in time. This was denied by the defendants.

The Official Referee said that it appeared that owing to the fault of the builders the plaintiffs were behindhand with their work and accordingly worked overtime throughout up to the time of opening. The plaintiffs alleged that the defendant, Mr. R. B. Green, ordered them to do that and that they understood his firm would be liable for the cost. The defendants denied that that order was given and he (the Official Referee) could not find that the defendants bound themselves to pay for the overtime. He had considerable sympathy with the plaintiffs who had been put to a great deal of trouble and expense in getting the work done and it was a great pity that the defendants did not make the plaintiffs an offer of payment. If that had been done it would have been a gracious act and would have saved the trouble and expense of the litigation. He entered judgment for the defendants.

Universal Lamp Co., Ltd.

In the Companies Court on February 8th Mr. Justice Bennet had again before him the petition for the compulsory winding-up of the Universal Lamp Co., Ltd., Great Eastern Street, E.C., the petitioners being Thorn Electrical Industries, Ltd.

When the petition was last before the Court, Counsel for the Universal Lamp Co. asked for an adjournment of the hearing of the petition so as to allow the company to put forward a scheme of arrangement, and this was agreed to.

When the petition was called on Monday Counsel for the petitioners said that at a meeting of the lamp company an offer was made which was wholly unacceptable to the bulk of the creditors and that meeting had been adjourned to enable the company to put forward some concrete scheme acceptable to the creditors. It was ultimately agreed that the hearing of the petition should stand over until February 22nd.

Parliamentary News (BY OUR SPECIAL REPORTER)

Coal for Power Stations

IN the House of Commons on February 3rd Mr. Batey asked the Minister of Transport if he could state the number of tons of coal purchased by all the electricity undertakings in Great Britain in 1935 and 1936.

Mr. Hore-Belisha said that during the year ended December 31st, 1935, the quantity of coal consumed in the generating stations of authorised electricity undertakers was 11,279,142 tons. In addition, 168,437 tons of coke breeze was used. Figures for 1936 were not yet available.

Street Lighting

Mr. Guy asked the Minister of Transport if he had any information in his department as to the comparative costs of the installation and maintenance of sodium and mercury vapour electric lamps for street lighting.

Mr. Hore-Belisha said he would not be justified in making a pronouncement on this question at the moment.

Profits of Undertakings

On the same day, in reply to a question by Mr. Batey, Mr. Hore-Belisha said that the figures for the gross surplus of authorised electricity undertakings (public authority and company undertakings) in Great Britain and for the appropriation thereof were as follows:—

Year.	Gross Surplus.	Appropriation of Gross Surplus.	
		Interest and Dividends.	Depreciation, etc., Funds. Debt Redemption and other purposes including balances.
	£	£	£
1933–34	35,807,978	15,008,962	20,799,016
1934–35	36,950,356	15,372,802	21,577,554
1935–36	*38,970,000	*15,814,000	*23,156,000

* Approximate figures.

Selected and Non-selected Stations

On February 4th Mr. Messer asked the Minister of Transport if he could say how many selected generating stations there were under the various electricity schemes, the companies and corporations owning them, and their installed capacity at December 31st, 1936, and if he could give the same information respecting non-selected generating stations operating under licence from the Electricity Commissioners.

Mr. Hore-Belisha said that the number of selected and non-selected generating stations at December 31st, 1936, was as follows:—

	Selected Stations.	Non-selected Stations.
Public authorities	90	122
Companies	47	120
Total	137	242

Complete figures of the plant installed and plant taken out of operation during 1936 were not yet available, but the figures of installed capacity at December 31st, 1935, were as follows:—

	Selected Stations. Installed Capacity. Mill. kW.	Non-selected Stations. Installed Capacity. Mill. kW.
Public authorities	3.96	0.85
Companies	2.78	0.51
Total	6.74	1.36

The names of the public authorities and companies owning selected and non-selected generating stations were contained in the Statistical Volume of the Electricity Commissioners for 1934-35.

New Broadcasting Stations

On February 8th Mr. Day asked the Postmaster-General what proposals had been submitted to him by the British Broadcasting Corporation for the provision of stations with the object of providing alternative programmes in the northern or western sections of Great Britain; and whether his approval had been given to any such proposals.

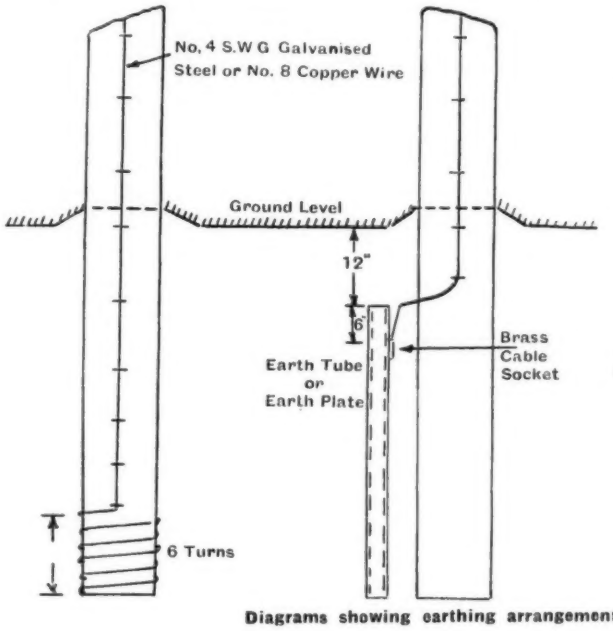
Major Tryon said that the Corporation had arranged the following changes. Stations at Burghead in Morayshire and at Penmon in Anglesey had been put into service within the last six months. A station at Stagshaw near Newcastle-on-Tyne was under construction. The establishment of new stations in South Devon and in the neighbourhood of the Bristol Channel had recently been authorised.

Earthing in Rural Systems. By John McCombe, Ph.D.

Some methods of obtaining low-resistance values

IN rural areas difficulty is often experienced in obtaining low values of earth resistance for high-voltage electrical equipment, but the necessity for such values cannot be over-stressed from the aspects of danger to life and of efficient operation of the protective system under earth-fault conditions. The earthing of high-voltage poles can be classified under the following two headings: (*a*) continuous overhead earth wire, and (*b*) the individual earthing of each pole.

A continuous overhead earth wire is principally used in rural practice where "A" poles with suspension insulators are employed. It consists of steel stranded wire with catenary suspension from each pole and earthed to electrodes in the ground at so many points per mile. With pin-insulator construction the difficulty of fitting the earth wire as the top wire, which is the most effective position, reduces its use.



Diagrams showing earthing arrangements

Individual earthing of each pole is the common method for earthing high-voltage poles. The earth wire, of No. 4 s.w.g. steel or No. 8 s.w.g. copper, is stapled at the top of the pole (right-hand diagram), and passes down the side, being looped round each bolt to earth the steelwork. When it reaches within 1 ft. of the butt it is wound round in a series of six turns, and finished on the butt as a spiral. The wire is fixed to the pole by galvanised staples approximately 18 in. apart. This spiral ensures constant contact between the earth and the wire, and, in addition, greatly facilitates the moving of the pole laterally during erection.

A different earthing arrangement is adopted at switch poles and at poles close to roadways or in very dry ground. The earth wire is cut short and soldered into the brass terminal socket of a galvanised-steel tube sunk in the ground (left-hand diagram). In place of tubes cast-iron earth plates are sometimes used, but this arrangement is much more expensive. With pole or ground mounted transformers the earth electrode for the neutral point consists of a bank of four galvanised-steel tubes or plates.

In rocky or very hard dry ground it is extremely difficult to obtain a low value of earth resistance for the transformer neutral. I have experimented with various types of earths, including the setting of earth plates and tubes in special beds of coke, watering the coke with brine, and using special flexible copper mats in place of the tubes or plates. These methods, in addition to being expensive do not always give the required results. Further experimental work proved the burying of lengths of stranded-copper conductor to be the most effective earth electrode.

A trench 18 in. deep is dug, and a continuous length of 0.058 sq. in. stranded copper conductor is buried in it. Periodic tests of earth resistance are made in order to determine the amount of buried copper needed to reduce the value of the earth resistance to approximately 1 ohm. The approximate cost of such an electrode is 3d. per yd. for 0.058 sq. in. copper and 25s. per 100 yd. for labour in excavation and reinstatement.

With earlier earth electrodes of this type, the practice of running out lengths of copper radially from the transformer was adopted. It was found, however, that less copper was required to give the same resistance value if one continuous length of copper was employed.

Some recent experiments with transformers situated near the sea indicated that an effective earth electrode could be obtained by running the copper conductor into the silt or mud. Close observation is being kept of this to find if this arrangement is permanent or whether the copper becomes corroded.

The Institution Dinner

EACH year sees an appreciable increase in the number of those attending the annual dinner of the Institution of Electrical Engineers. On February 4th the thousand mark was passed for the first time, 1,015 members and guests being received by the President of the Institution, Mr. H. T. Young, at the old skating rink at Grosvenor House, Park Lane, London, W.

The toast of "The Institution of Electrical Engineers" was proposed by Lord MacMillan, who contrasted the present position with over 17,000 members with that obtaining on its formation in 1871, when the membership was seventy. Now, he said, ninety-eight countries were illuminated by electricity. He especially commended three activities of the Institution: as an examining body, as supporting original research, and as providing a benevolent fund for those who fell by the way.

In responding, the President stated that there were now fourteen centres and sub-centres of the I.E.E. in Great Britain and twelve local committees abroad. Those in China and South America had strengthened themselves by working in conjunction with the Institutions of Civil and Mechanical Engineers there. Last year 800,000 new consumers were connected and the output of generating stations had increased by over 15 per cent. At Battersea more electricity was produced in 1936 than in the whole of the United Kingdom when King George V ascended the throne. The honour recently accorded Sir George Lee reminded him that of the 2¾ million telephones in use, half a million had been installed last year. Another electrical concern, the British Broadcasting Corporation, served eight million licence holders, an addition of 750,000 in twelve months.

Emphasising that the future of electricity lay in utilisation, he urged co-operation with architects, builders and medical men with this purpose in view, and mentioned some notable recent achievements due to such association. He suggested that naval vessels should be illuminated on the Thames as a feature of the Coronation celebrations.

Mr. C. C. Paterson proposed the health of the guests, for whom Lord Stonehaven and Mr. S. Tatchell responded. The last-named stated that in 1934 the amount of electrical equipment in buildings was valued at £50 million as against £24 million in 1924. The banquet was followed by the usual reunion, which provides so welcome an opportunity year by year of meeting once more old colleagues and others from all parts of the country.

The Engineers' Ball

On the following evening (February 5th) the Electrical Engineers' Ball took place at Grosvenor House, when a large company enjoyed a very pleasant few hours. It is expected that the function will yield a very satisfactory contribution to the I.E.E. Benevolent Fund.

Meetings and Discussions

In this year's Faraday Lecture Mr. R. S. Whipple demonstrates how important a place is occupied by electricity in the modern hospital—for diagnostic work, treatment and surgery. The extensive system of communications which ensures the efficient and reliable operation of the grid was described by Mr. J. D. Peattie at a meeting of the Transmission Section of the I.E.E. on Wednesday, and at last night's I.E.E. meeting Mr. F. C. Winfield dealt with measures to prevent, or at least minimise the effects of, fires in power stations

How Hospitals Employ Electricity

THE annual Faraday Lecture, to which the public is admitted free, was delivered by Mr. R. S. Whipple at the Mersey & North Wales (Liverpool) Centre of the INSTITUTION OF ELECTRICAL ENGINEERS on February 8th. It is to be repeated at other provincial centres and in London. This year's subject is "Electricity in the Hospital," illustrated by lantern slides, exhibits and demonstrations. The lecturer briefly referred to the general uses of electricity in hospitals for lighting (normal and emergency), heating, power, lifts, etc., and then outlined its earlier applications to medicine.

He said that the Middlesex, a typically progressive London hospital, had 6,000 lighting points, and 27 large lifts in continuous operation. Ten electricians, five of whom were fully qualified and had detailed knowledge of the electro-medical apparatus used, were on the staff of the hospital.

The earliest application of electricity in hospitals was at the end of the 18th century, when patients were brought to receive shocks from Leyden jars, with a view to curing paralysis and minor complaints. Little progress in electro-medical treatment was made until 1850, when Duchenne, a doctor at Boulogne, discovered that individual muscles could be stimulated by applying moistened electrodes to the overlying skin. The majority of muscles contracted only if the electrode was placed at one spot, called the motor point, near the place where the motor nerve entered the muscle. By using several varieties of currents injured or paralysed muscles could be exercised and might eventually be restored to their normal activities.

One of the most important developments of therapeutical treatment by electricity was that of high-frequency currents: d'Arsonval showed that the motor or sensory nerves did not respond to currents of high frequency and that the response of the nerves was proportionately less as the frequency increased. At frequencies of over 200,000 the motor and sensory nerves were completely unaffected, and only a sensation of heat was produced. In 1907 Nagelschmidt, and in 1909 Lewis Jones, demonstrated diathermy, as it is now called, the effects of heat applied in this way being an increased blood supply to the treated part, relief of pain and increased local nutrition.

The effects of treatment with ultra-short waves (10 metres and downward) promised possibilities of ameliorating the condition of a patient suffering from such complaints as carbuncles, abscesses, various forms of skin diseases, or certain types of duodenal ulcers, etc. Pyorrhea, a disease of the gums, had in many cases been successfully treated by ultra-short wave diathermy.

One of the most important developments in ultra-short wave diathermy was in connection with surgery. By means of the diathermic current it was possible to raise the temperature of a portion of tissue so much that it was possible to coagulate it, or even boil the tissue fluids. The temperature was raised to this height by reducing the size of the electrode which, either in the form of a needle or scalpel, then became the cutting tool, in reality coagulating the tissue. As a result it was possible for the surgeon to remove an easily accessible growth without difficulty and without loss of the patient's blood.

The production of X-rays, originally for diagnostic work, was now also becoming a therapeutic agent of the greatest importance. Every large hospital had apparatus devoted to the two objects. On the diagnostic side, photographs were taken of nearly all injuries. Lung cases were watched by means of photographs taken at intervals, and patients suffering from complaints due to defective digestion were studied by means of photographs taken after the patient had swallowed a bismuth meal. The statement that collectively the ten largest hospitals in London took approximately a million X-ray photographs annually, showed the importance attached by the medical staffs to the X-ray photograph.

The efficacy of the treatment of many skin complaints by X-rays was well known. The treatment of deep-seated ulcers, etc., was not so well known, but it was none the less of great importance to the community. This treatment demanded the use of X-rays of great penetrative power, and several able physicists and electricians were working at the problem of increasing the penetrative power of the rays produced. At the present time St. Bartholomew's Hospital was installing a tube to be used with a potential across the terminals of two million volts.

One of the comparatively recent innovations in hospitals was the electro-cardiograph for the study of the condition of the heart; for this the patient supplied the electrical energy. The electro-cardiograph consisted of a very sensitive quick-acting galvanometer which responded to the variations in the electric current generated by the heart. From a study of the variations in the e.m.f. given by the heart (recorded photographically) the experienced doctor was able to diagnose the form of heart complaint, and perhaps, what was more important, was able to tell from a series of photographs taken at intervals of a few weeks the efficiency of his prescribed treatment. The success of the applications of electricity to the treatment of disease depended entirely on the close co-operation of doctor, biologist, physicist and electrical engineer.

Demonstrations included electrical stimulation of a nerve; diathermic rise of temperature and cutting of flesh; the beating of a human heart by projecting the image of a galvanometer string on to a screen; mobile X-ray apparatus, mercury-vapour lamps and infra-red radiators.

Power Grid Control

THE control rooms of the national interlinking grid system and their equipment are described in a paper by Mr J. D. Peattie (of the Central Electricity Board), which was read before the Transmission Section of the INSTITUTION OF ELECTRICAL ENGINEERS in London on February 10th.

There are seven such centres, at Glasgow, Newcastle, Leeds, Manchester, Birmingham, Bristol and London. The communication channels employed (mostly in underground cables) for telephony, signalling and remote indication, are rented from the Post Office, which maintains them and provides alternative circuits in emergencies. Thus reliability is enhanced and national expenditure minimised.

For short distances continuous metallic circuits are at present used, suitable, if required, for d.c. signals (15 mA at 50 V limit). For longer distances the P.O. channels pass through repeater stations and a.c. signals only can be transmitted (2 mA at 2 V limit). The terminal equipment supplied by the C.E.B. must be approved by the P.M.G., who stipulates safety precautions. These requirements have been met on circuits using a.c. signalling by inserting a specially insulated transformer between the P.O. line terminals and the signalling equipment at the outlying stations. Where d.c. signalling is used, the signalling batteries are specially insulated and connected to the P.O. lines through specially insulated relays.

The telephone and automatic indicating apparatus is always combined in one equipment. Four main types have been installed, three of which are developments of automatic telephone gear, while the fourth is a development of a system already widely employed for the remote operation of switchgear.

Except in Newcastle and London the control engineer has access to, and prior claim from his desk on, the outgoing channels. At the distant end the operator at the generating station or switching centre has also first call on the channel. In London and Newcastle, where the telephone traffic is particularly heavy, telephone operators at a private control exchange handle most of the calls to and from the control engineers in order to relieve the latter. As a further precaution, to preserve this line of communication during maintenance work on the automatic equipment, a simple emergency telephone system is provided which short-circuits the automatic equipment at each end and enables the control engineer and the operator to revert to simple telephone communication. The possibility of more widespread interference with the communication arrangements has not been lost sight of.

Immediate indication of the tripping of a main circuit-breaker is given priority over speech. Indication of the operating position of ratio-change equipment, meter readings on demand, and the transmission of routine instructions, follow speech in order of priority over a channel.

The automatic indicating equipment transmits three main groups of information:—(*a*) positions of circuit breakers and ratio-change switches; (*b*) routine instruction signals, and (*c*) load readings. The initiating devices consist of 2-way or 15-way auxiliary switches on the main circuit-breakers and

Electricity in Healing
Operating the Grid
Power Station Safeguards

ratio-change equipment respectively, special dials or keys for the routine instruction signals, and special meters operated by the usual instrument transformers for the meter readings.

As an example of flexibility in application, the addition to the central indicating equipment in South-West England and South Scotland, and to a limited extent in North-West England, of intertripping facilities for the power-system protective scheme may be mentioned. The indicating devices consist of: (*a*) coloured lamps or illuminated semaphores for oil switch indication; (*b*) rows of lamps, edgewise scales and circular dials for ratio-change indications; engine room telegraph dials for routine instructions; and (*c*) conventional indicating instrument dials for meter readings. Several systems are in use for remote metering, on demand.

There is also continuous indication of loads over vital interconnectors having capacities small in comparison with the loads on the systems they connect together. For this purpose the photo-telemetering system has the great advantage that, by utilising different carrier frequencies, the readings of several meters can be transmitted simultaneously over one channel. In addition, if the characteristics of the channel are suitable, frequency bands above 2,000 can be allocated to this duty without interfering with ordinary telephone conversations.

A large proportion of the equipment used by the control engineers is concentrated on their control desks. Complete system diagrams are provided at each control room, showing all lines, circuit-breakers, isolating and earthing switches, and transformers, under the control of the Board. Change of position of any circuit breaker operates an audible alarm in the control room and illuminates a red lamp on the station panel in question.

In the case of equipment of the automatic telephone type, attention is drawn to the particular indication concerned by a flashing signal, which continues until the signal is accepted or cancelled by movement of the corresponding semaphore on the miniature diagram built into the control desk, which ensures that so far as the circuit-breakers are concerned the dressing of the diagram must correspond with the actual position of the circuit breaker. In the other type of automatic indicating equipment, the acceptance of such signals is carried out by alteration of a visual indicator on the wall panels. The miniature desk diagram can also be used to operate electrically the semaphores on a large-scale wall diagram if required.

[*Elec. Rev.* photo.

At last week's I.E.E. dinner (see page 257). Left: Lord Eltisley, Mr. J. W. J. Townley and Mr. E. E. Hoadley. Right: Messrs. A. P. Wilmshurst, F. C. Winfield and G. L. Porter

Fire Precautions in Power Stations

WHILE electrical duplication, or multiplication, of plant is a recognised essential, it is an insufficient precaution against the twin risk of explosion or fire in power stations and major system sub-stations arising from failures of electrical plant within them. True physical segregation to ensure that duplicates cannot be simultaneously impaired means division in a suitable degree within separate buildings or enclosures.

But the paper by Mr. F. C. Winfield which was read before the INSTITUTION OF ELECTRICAL ENGINEERS in London yesterday (Thursday) evening points out that the rarity of serious mishaps in general justifies segregation into only two separate groups, so that an explosion or fire shall be limited in its worst effects to a section, or group of plant items, which can in emergency be done without.

This is the author's main objective, his second being the limitation of damage following a fire to a degree which will ensure that the subsequent emergency state shall not continue too long, as during this period the essential principle of electrical duplication no longer holds and electrical faults are relatively frequent.

The governing principles, which are discussed in detail in the paper, are enumerated in three classes as (*a*) provisions which ought always to be made (1) the use of switchgear and plant of adequate capacity, soundly designed and constructed, and provided with suitable automatic protective arrangements; (2) the complete electrical and fire sectioning into at least two duplicate parts of the switchgear, transformers, cables, &c., supplying an electrical system or independent portion of a system; (3) minimum arrangements for fire fighting; (4) heating of buildings, to reduce risks of insulation failures.

(*b*) Provisions which are easy and inexpensive to make and which reduce the spread of fire or consequential damage within a fire section (1) sealing of holes in floors or internal parts of any single fire section which has natural structural barriers; (2) the elimination of combustible matter not inherent to plant, *e.g.*, waterproofing of cables, oil stores, &c.

(*c*) Provisions which while not essential are desirable and should be applied where the importance or special conditions of the station justify the expenditure (1) floor drainage to remove oil quickly; (2) permanent and local fire-extinguishing plant, either automatic or remote-controlled if the station is permanently attended.

The author contends that bus-bars are not true duplicates in the fire-risk sense unless each bus-bar with its associated bus-bar isolators is mounted in a fireproof chamber separate from the other bus-bar and isolators and from the circuit-breakers. If duplicate circuit-breakers are employed for each feeder (an arrangement considered unnecessarily expensive) each separate bus-bar should be associated with its corresponding circuit-breakers in a fireproof chamber. Further, irrespective of whether one or two circuit-breakers are employed per feeder, since the feeder itself is necessarily singular, in a true duplicate scheme the feeder terminals with the feeder isolators must be mounted in separate fireproof enclosures. The section circuit-breaker must also occupy a separate chamber.

The paper shows diagrammatically how this kind of arrangement can be secured, together with a suggested method of sealing cables passing through floors. The author cannot justify any material expenditure on individual fire protection for every power cable. Also (provided no control cables are common to several fire sections), he does not agree that there is any prime necessity for the segregation of control cables from power cables. But he does consider that when bus-bar protection does not exist it is desirable to reduce the risk to those portions of control cables which are within a switch chamber sufficiently to ensure a reasonable period after the initiation of the fire during which tripping control remains available. In practice, lead-covered cables give this security to a degree, but this can be supplemented by light metal enclosure.

For protecting structural steelwork and roof trusses a covering of sprayed or block asbestos is probably superior to concrete. All internal doors should be fireproof and self-closing, while oil drain holes in floors should be of the quench-

ing type. Oil-switch explosive forces are too violent to be withstood by brick or even steel-framed buildings of conventional types. Investigations are being continued, but meanwhile windows and doors should be arranged to act as relief vents. Distinct buildings, which need be separated by a few feet only, are preferable to buildings divided by barrier walls.

With transformers it is desirable to go beyond mere group sectioning and to adopt unit sectioning, preferably in independent chambers opening to the outer air and sealed off from the inner side. Intermediate barrier walls may be necessary between outdoor transformers.

One important zone does not usually have direct protection, namely, the bus-bars. This zone usually includes, in addition, the circuit-breakers themselves, the bus-bar isolators, and, most frequently, the feeder isolators. It is possible to provide partial protection by lightly insulating the switchgear from earth and from the associated cables and employing a fault device to operate when current flows through a single earth connection; or, alternatively, by employing a system which balances all the currents to and from the bus-bars, again requiring insulation of cable-sheaths from the switchgear. Finally, a system of time-graded leakage protection can be employed. The problem is actually much more complex than many of its advocates realise, for reliability of supply must not be impaired.

All important high-voltage switch houses should be heated to prevent condensation, which is one cause of insulation failure. For indoor switchgear fire extinguishing the author prefers CO_2 or methyl-bromide fixed installations and saponine foam for outdoor switchgear. For transformers and oil spraying on to hot pipes he advocates fixed installations of the high-pressure water-spray type, which can be very rapid in action and also possesses cooling capacity. The importance of major stations often justifies elaborate automatic fire-fighting equipment.

Mr. Winfield strongly asserts that attempts to preclude "black-out" entirely in the remote and extreme emergency of a major fire are directly contrary to the public interest, since they involve excessive expenditure which must be reflected in the ultimate price. But such an interruption ought to be of short duration only. For this reason he emphasises that the main switchgear, in a truly interconnected system, is of more importance than the station.

Portable Drills for Coal and Stone

A PAPER dealing with portable electrical and compressed air drills for coal and stone was read and discussed at a meeting of the London Branch of the ASSOCIATION OF MINING ELECTRICAL ENGINEERS on February 2nd by Mr. C. E. Luxton.

In the course of the discussion Mr. B. B. Evans said he was under the impression that vibration was transmitted to the cable to which the drill was attached, resulting in failure of the cable about a yard away from the drill, but Mr. Luxton suggested that breakages were not due so much to vibration as to the human element.

Dr. W. Zwansig referred to experiments that were being conducted with the object of providing in the cable a cushioning effect against vibration. By using tungsten carbide bits the spindle speed was increased and coal cutting improved, but for drilling hard stone it was impossible to attain the necessary high pressure without using a stand. Since remote control was introduced about 99.5 per cent. of the direct switching troubles had disappeared.

Mr. J. A. B. Horsley (Chief Electrical Inspector of Mines) did not think they had really learned the reason for the breakage of the flexible cables attached to drills, nor had they found a remedy. If vibration were at the root of the trouble it must come from the bit tip, not from the motor.

Mr. J. W. Macdonald hoped an electric drill would be designed which would withstand stalling and not burn out. Mr. Luxton said he believed the proportion of burn-outs was very small, for the adequate protection afforded by the control gear prevented it. In his experience the majority of breakdowns were mechanical, being due to the treatment to which the tools were subjected.

Mr. A. Stewart suggested that Mr. Luxton had been unduly generous in his references to compressed air. In one case not more than 20 per cent. of the power of the electric motors driving the compressors on the surface was applied at the working face. By using inbye compressors enormous leakages could be avoided, but compression of the mine air did not improve ventilation. As an example of the economy to be effected by using electrical plant, Mr. Stewart mentioned a case in which compressed air plant of 900 h.p. at the surface had been replaced by electrical plant of 220 h.p. with better results.

Mr. S. Flax referred to a newly developed cable which had been in use for three months without breakage under precisely the same conditions as cables which formerly had broken at intervals of from 10 to 14 days. He believed the breakages had been due mostly to vibration. Instead of a ribbed centre, which was usual in drill cable, a smooth rubber centre was used, but he was not sure whether the Mines Department would permit the use of a cable if it had not a ribbed "Cracore" centre. Mr. Horsley replied that the Department would be prepared to consider it on its merits.

The Branch President (Mr. J. Urmston) said that a cable with a screen around it was very easy to test; d.c. would detect holes so small that they could not be found even by immersion in water. The application of high voltage a.c., even for a short time, was more liable to produce ozone and so crack the rubber, but d.c. up to 30,000 V would not harm the insulation if it were sound.

Noise Meters

THE performance of noise meters in terms of the recently formulated standard is discussed in a paper by Messrs. B. G. Churcher and A. J. King (Metropolitan-Vickers Electrical Co., Ltd.) which was read before the Meter and Instrument section of INSTITUTION OF ELECTRICAL ENGINEERS in London on February 2nd.

The unit of "equivalent loudness" is the British Standard phon, and it enables a consistent unifying system of noise measurement to be set up, relevant to the manner in which sounds are normally heard. Under suitable laboratory conditions and using the technique described, representative e.l. values in accordance with the definition may, in general, be determined to within ±2 phons with a group of ten observers. An increase in the number of observers is likely to be the best means of increasing precision.

With regard to equal-loudness relations, it is the authors' view that, in the study of noise as ordinarily perceived, the relations used should be determined directly for free-field conditions. The indications of the conventional objective meter can be so wide of the mark that the authors have, as an intermediate step, explored the possibility of removing some of the practical objections to subjective secondary methods. The two-telephone meter enables a steady noise of any type to be measured in the field within limits which are sufficiently small for most technical purposes. Uncertainty may be further reduced, without employing an impracticably large group of observers, by the adoption of special precautions. The two-telephone meter forms a convenient means of measuring noise associated with irregular sound fields, and is not liable to arbitrary effects which may arise with objective meters when field irregularity is present. The one-telephone meter is convenient in use, but its indications are not so trustworthy and are liable to a correction the basis of which does not appear to be very certain.

The authors' experience confirms the view that in subjective measurements the impressions of an observer do not form a trustworthy indication of the conclusiveness of his judgments and are often completely at variance with the recorded observations. Considered as a generally applicable noise-meter, the performance of the conventional objective meter is altogether inadequate. It forms a valuable means of measuring loud noises, but since the object of research in engineering-noise problems is to reduce noise to moderate or low levels, this type of meter is of restricted value.

Stoker Power in Ships

IN the course of a paper outlining the advantages of mechanical stokers for marine boilers, by Mr. G. T. Marriner, which was read before the INSTITUTE OF MARINE ENGINEERS in London on February 9th, it is stated that the power absorbed by the stoker motors, forced and induced draught fans and coal crushers is 21.8 h.p., or about 0.58 per cent. of the total power in the case of a vessel with a designed s.h.p. of 3,800.

In the case of the *Manchester Hero*, an old ship which was converted, in addition to the Bennis stoker plant it was necessary to provide a 36.75 kW electric generator, a forced draught fan and a high speed cold air fan. The increase in efficiency was about 6.5 per cent., using cheaper fuel. The *Manchester Port* is a new vessel equipped with twelve Bennis stokers and coal handling plant. The total power required normally is 8.8 kW and the steam driven forced draught fan needs 10 h.p., together making 21.8 h.p., or 9.6 h.p. for all purposes per ton of coal burned per hour. Ammeters mounted with the various electrical controls afford useful indication of hot bearings or coal jamming in time for investigations to be made before safety shearing pins break.

In the second portion of the paper details are given of ships fitted with multiple retort Taylor underfeed stokers, the author remarking that generally the electrical power consumed by the stokers is so small that conversion can be made without altering the existing generating set. In the case of the *Beaverhill* the power needed to drive each stoker is 1.12 h.p. per ton of coal burned per hour.

Correspondence

Contributions from readers are welcomed. The writer should give his name and address, not necessarily for publication

The Age Limit Problem

The letters in your issue of January 29th from Messrs. Milne and Nutter draw attention to a deplorable feature prevailing in the electrical industry as revealed by the "Situations Vacant" columns. Sir William Beveridge referred to the seriousness of this anti-social practice of snatching at youth during the British Association meeting last year.

If industry and commerce are unable or unwilling to provide employment for those over 35 or 40 some Government action must be taken to secure adequate pensions from industry for these people. Many defended the interests of this country in the war, and are again being invited to join for the defence of the country, which now deprives them of their livelihood. An association should be formed to defend their interests and representations made to their respective M.P.s.

Wembley, *February 3rd.* E. WARREN.

Compulsion for Contractors

I am very pleased to see that Mr. A. Milne considers that compulsory registration of electrical contractors is not far off, but I fail to see what good will be done until supply authorities are made to toe the line.

We may expect every assistance from the I.E.E., but we must not lose sight of the fact that in many cases members of that useful body acting as chief engineers for supply authoritiies are guilty of allowing the regulations to be disregarded.

For instance, three months ago I was called to a large house to attend to a minor fault. I found the installation in a very bad condition, and to prove my statement to the tenant I carried out a comprehensive test and inspection. Here is a brief summary of what I found:—

Zero readings to earth on three of six circuits, broken continuity in several places; lead-covered cable tapped into screwed conduit *via* open tees; and unearthed metal switches in bathrooms, tiled-floor scullery, larder and garage.

My report appeared so severe that the tenant decided to call in the supply company to test. This was done, and the outcome was that the whole installation was condemned as unsafe. The owner was approached but apparently does not intend to move in the matter. The tenant will not do anything, yet the company still supplies these premises. How can a mere contractor safeguard the public when such instances prevail? INTERESTED.

February 5th.

Multiple Earthing

The issue of the ELECTRICAL REVIEW for February 5th gives details of the E.R.A. report for 1936, in which reference is made to protective earthing and multiple earthing of neutrals is recommended as a means of reducing risks from shock in areas where earth resistance is high. May I suggest that one authority only should have power to sanction the use of protective apparatus once that authority is satisfied the apparatus does provide the protection claimed for it. At present there is far too much delay, and discouragement of invention, not on technical grounds but from considerations as to whether the use of such apparatus might not be "technically" in conflict with some rule and regulation of some other authority.

In the ELECTRICAL REVIEW of September 20th, 1935, I gave details of a neutral relay which entailed the connection of consumers' apparatus to a neutral conductor, *via* the relay, when a leakage from phase would interrupt the supply before a dangerous potential could appear between the consumers' apparatus and earth. The resistance of the earth circuit has no effect on the relay which also provided for neutral to earth potential difference due to unbalanced loading of the system comprising the neutral. This relay was developed following the discovery that earth resistance may exceed 15,000 ohms when measured from a consumer's premises especially in hilly districts. Its use does not require multiple earthing of neutrals in high earth resistance areas and where earthing is of very doubtful value.

The question arose as to whether a trip coil connected between a neutral and earth would constitute a multiple earth and therefore conflict with the regulations covering insulated neutrals. Until an authoritative pronouncement can be obtained the protective means remains in "cold storage" while the risk from shock remains an active hazard. While the E.R.A. report confirms that very high earth resistances prevail at consumers' premises, apparatus to obviate the trouble cannot be applied because of a technical quibble, or until some authority can authorise its use in high-resistance areas.

Interference suppressors which are being installed to improve radio, comprise a condenser connected between consumers' apparatus and the neutral conductor, so the question here arises as to whether such apparatus constitutes multiple earthing of neutrals. If not, where is the line of demarcation?

Liverpool, *February 5th.* A. G. BULLEN.

Too Many Technical Terms

In his article under the above heading on this subject in the January 29th issue of the ELECTRICAL REVIEW Mr. Cosens makes a plea which has in fact been made for years past by the British delegates attending meetings of the International Electrotechnical Commission. These delegates have not been expressing merely personal views, but those of the fully representative British National Committee of the I.E.C.

The American floods: This picture shows the Ohio River at Louisville, Kentucky, on January 24th, by which time the power station and the factory district were half submerged beneath the swollen river

Mr. Cosens suggests that the *maxwell* and the *weber* are not both needed. At the last meeting of the I.E.C. the British delegates opposed the establishment of a special name for the practical unit of magnetic flux, but suggested that the *volt-second* (short for volt-second per turn) should be used if a unit was really required.

The real point is, however, that various names have been in use in different countries with different meanings, and short of scrapping all existing names and starting afresh (a proposal which was actually made some years ago by Great Britain) it was essential to remedy the growing chaos by taking steps to ensure at least that any particular name should be applied to only one unit. As an example of the chaos existing some years ago, it may be pointed out that the *weber* has been used by some countries as the practical unit of flux and in other countries as the C.G.S. electromagnetic unit of current. Again, the *gauss* was used for both the quantities B and H, apparently without proper appreciation of the significant differences between these quantities.

With regard to the term *hertz* as the unit of frequency, here again the British National Committee of the I.E.C. has consistently expressed the view that no special name for the unit of frequency was necessary. Several Continental countries, however, had already adopted the term, and in order to prevent this term being used by other countries for a different unit it was decided by the International Electrotechnical Commission to stabilise the position by including the *hertz* in their list of units.

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The same argument applies in connection with several other units, and, although we in this country may deplore the existence of so many special names, I think it will be evident that international action of some sort was essential. Nevertheless, it is not necessary for everybody to use these names. If we in this country are in the habit of expressing a quantity as a compound unit (*e.g.*, lines per sq. cm.), there is no reason why we should not continue to do so. J. F. STANLEY,

Assistant Secretary,
British National Committee of the I.E.C.

London, S.W.1, *February 2nd.*

Loughborough College Power Supply

My attention has been directed to the editorial in your issue of January 29th and the letter from the Loughborough borough electrical engineer on February 5th regarding the savings claimed by the College generating its own power. The explanation is simple. The greater proportion of the electricity generated is used for lighting laboratories and lecture rooms for day and evening classes. Before the establishment of the generating station the College paid at the normal prices charged to similar consumers.

When the station was first projected no offer of any departure from the charges was made by the then borough electrical engineer, and it is reasonable to suppose that had the station never been built the College would now be paying the usual charges operative to-day. That this supposition is a reasonable one is shown by the fact that one block of classrooms and laboratories situated about 200 yd. from the main buildings is still, and always has been, supplied with electricity by the Corporation at its standard prices, commencing at 5d. per kWh for lighting and 1d. per kWh for power, with a sliding scale depending upon consumption. The claim for the amount saved is based on the assumption that these charges would operate for the whole College.

Any offers of reduced prices at this date do not affect the situation; even if energy were supplied at ten kWh for a penny surely it is correct to argue that the resulting saving was due to the *fact* of the generating station and could, therefore, be fairly attributed to the station.

In any case, however, the primary function of the station is not to save money. Loughborough College stands in all its activities for training on production, and the generating station is merely one of the sections devoted to giving practical training under actual working conditions to the young engineer. J. F. DRIVER,

Head of the Department of Electrical Engineering.

Loughborough, *February 8th.*

The Future of the Tramways

We were very interested to read Mr. Jackman's letter in your issue of January 15th in defence of tramways. We have long been of the same opinion as Mr. Jackman that now is the ideal time for the Minister of Transport to consider the re-employment of trams instead of other means of transport. The Minister is now considering the laying out of many new roads which for safety's sake will be provided with dual carriage-ways.

Our contention is along exactly similar lines to Mr. Jackman's, namely, that a sleeper track should be provided between the centre of the dual carriage-ways. The sleeper track would run until the area of congestion was reached and then would enter a subway under existing streets.

The cars themselves would be single-deck trams, but arranged so that they could be controlled in one, two or more units, thus reducing the cost of operation to a minimum. We can see no reason why such tramways should not run up to speeds of forty or fifty miles per hour, enabling them easily to maintain a schedule of twenty or more miles per hour. One very definite advantage of this type of transport is that it would be entirely independent of weather conditions. We think that there is no question about the plan being feasible, as it has been adopted in large cities in both North and South America, on the Continent and in Russia.

Other advantages are cheapness of operation, cheapness of construction compared with tubes, and the cheapness of travel compared with any other means of transport. We believe that no transport undertaking could or would argue that any other form of transport is as cheap as the tramcar if the question of rates and road upkeep were dealt with in a fair manner. Actually, of course, road upkeep and rates would not figure in the scheme outlined above except to a very small extent.

We contend that if further proof is needed of the comparative cheapness of tram transport compared with other means of travelling, it is provided in full by the fact that wherever conversions have taken place from tramways to any other type of transport the fares have been increased from 50 to 300 per cent. Is it possible to travel by motor bus or trolley bus for eight or ten miles, or even a quarter of this distance, for 2d.?

We have been astounded at the complacency of electricity supply authorities towards the loss of one of their most useful loads, which they have made no apparent effort to keep. Is it not possible to rouse them from their lethargy?

We trust that, even if the Minister of Transport cannot see his way to act immediately on the lines outlined, he will at any rate provide sufficient margin between the dual carriageways to permit at a later time suitable sleeper tracks. The cost of such provision now would be negligible, but later it might be prohibitive.

In conclusion, we would say that the letter from Mr. L. C. Ford in your issue of January 22nd is typical of the attitude of the tram hater. He alludes to the tramcar as an anachronism. We contend that the modern tramcar compares more than favourably with the motor bus for comfort, lighting, speed and quietness; acceleration and deceleration are also better. W. RIVITT,

Publicity Manager, E.M.B. Co., Ltd.

West Bromwich, *February 2nd.*

Recent Testimonials

I agree with "Inquirer" that the provision of testimonials is a stumbling block to many who wish for a change. It would be interesting to have the views of the advertisers. I suppose they would like a testimonial from the present employer, but from whom should the others be: the vicar and the family doctor or friends of the applicant?

Some employers object to giving testimonials but will answer questions by a prospective employer. I know of a case of a fitter who had a good reference from one employer, but the employer who had recently paid him off owing to shortage of work took the above attitude. The members of the committee considering the applications suggested that the applicant must have done something serious that the firm would not give him a reference. It could not wait and write for one.

Surely a statement that a man has been employed for so many years in a certain capacity is all that is needed, for an employer does not keep a man at a job for ten years if he is no good.

Many a man dare not approach his employer with a request for a testimonial, and I would suggest that an employer should be compelled by law to give each employé a written statement when discharging him or, if he is kept on, every three years (five years in the case of a staff employé) giving his length of service, the capacity in which he was employed, and the reason for his discharge, any other comments being optional.

February 5th. ASSISTANT ENGINEER.

I entirely agree with the statements put forward by "Inquirer." I have recently had the same trouble as he has experienced. In anticipation of changing my situation for one with brighter prospects, I cannot possibly obtain "three recent testimonials" as required by the majority of advertisers.

I have only worked for one firm, my present, and for them 7½ years. The only testimonials I can obtain are from my present employer and the principal of the local Technical College at which I learned my theory.

I consider that you would be doing a large number of readers a good service if you could suggest to advertisers that they should either omit the clause in question or provide an alternative that would enable workmen such as myself to come within their scope. ERIC S. WEEKS.

Portsmouth, *February 7th.*

The Promotion of Engineers

There is stagnation of promotion of engineers in London, which I believe to be chiefly due to the inflow of provincial men; once there was a healthy outflow, thus a spread of experience, but not now. It is difficult for men over thirty-five to get promotion; we do not expect the £850 a year posts—they are usually booked—but we do expect healthy competition for the £350-£400 a year jobs, not dice loaded against us with conditions such as personal prejudice, age limits and "area complexes."

How about discharging all chiefs after ten years in one post? A good many industrial companies and supply undertakings would be improved by a change. NEMO.

February 4th.

A Film Display

A babbling brook, trickling down the mountain side, destined eventually to feed the hydro-electric power stations, was the opening "shot" of the G.B. Instructional film, "Water Power," shown last week before the Junior Section of the Institute of Marine Engineers. Technical terms were explained diagrammatically, and the working of dams, aqueducts, pipelines, turbines, etc., graphically illustrated. In two other films, "Shipyard" and "Coal," electrical equipment was also much in evidence.

Business and Industrial Notes

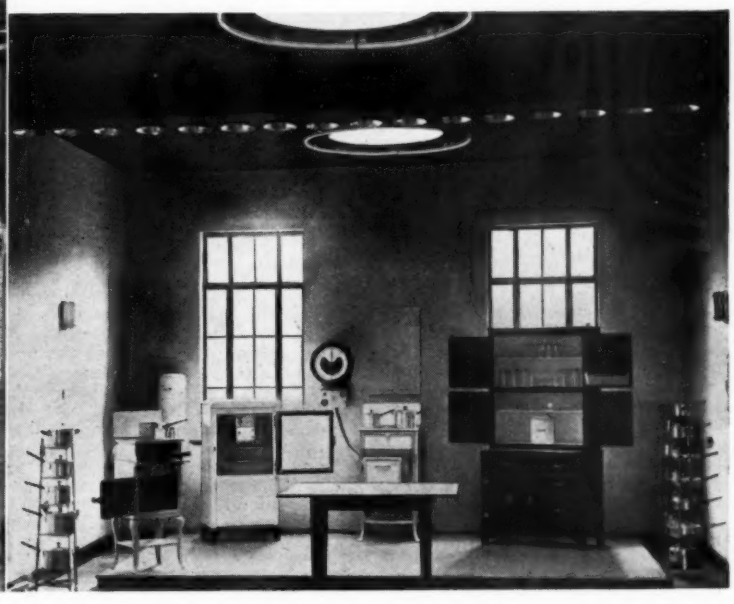
The Week's News. Showrooms and Exhibitions. New Installations. Overseas Trade. Publicity Material. Trade Announcements. Prices of Materials. Liquidations and Bankruptcies.

An Electrical Retailers' Association

In the great majority of cases the electrical contractor is also a retailer, and his interests have hitherto been protected by the National Federated Electrical Association, Ltd., an allied body of the E.C.A. This Association has represented contractor-retailers on the Fair Trading Council for the Electrical Industry. The N.E.C.T.A., however, has decided that electrical retailers need their own organisation. It has accordingly set up an organisation to be known as the National Association of Electrical Retailers, and members will be known as "registered electrical retailers." The N.E.C.T.A. organisation is to be placed at the disposal of the new association. The objects of the latter are extremely wide and provide for the protection and promotion of the interests of electrical retailers in every way, and include provision for taking action or assisting or co-operating with other bodies for protecting the interests of the public in the matter of unsafe apparatus. All persons, firms, or companies genuinely in business, either wholly or partly as electrical retailers, are eligible for membership. The annual subscription is one guinea. Inquiries should be addressed to the Director and Secretary, National Association of Electrical Retailers, Africa House, Kingsway, London, W.C.2.

New Showrooms at Congleton

The new electricity showrooms at 29, High Street, Congleton, are among the first in the country to incorporate the E.D.A. "I'm Electric" symbol in the architectural design of the premises. The "little man" is worked into the facia in two places, on the upper storey and in the neon sign on the ground floor. Neon lighting carries on the facia a bold inscription "Electricity Service," and neon has been used otherwise to embellish the front of the building. The showroom proper is on the ground floor and it uses tube lighting in a geometrical device to set off the terra-cotta ceiling. A large range of domestic equipment is displayed, together with various test apparatus. On the upper floor there is a demonstration and lecture room. Architectural tube lamps outline the dome windows in the ceiling and bracket lights enhance the mural decoration. At one end is a demonstration platform with provision for floodlighting. The main window, together with the showroom, are skilfully contrived to give an effect of an extension to the non-reflecting type of window, everything in the showroom being clearly displayed to the passer-by on the pavement. The new showroom was designed by and erected under the supervision of Messrs. Venables & Barker, architects, Hanley, and was opened to the public on February 6th.



The new electricity showrooms at Congleton, showing (left) the exterior and (right) the demonstration hall

E.D.A. Luncheons

The annual luncheon of the South-West England and South Wales (Southern) Area of E.D.A. will be held at the Grand Hotel, Bristol, on February 23rd, and on the following day the South-West England and South Wales (Northern) Area will hold its annual luncheon at the Westgate Hotel, Newport. The North-West England and North Wales Area is holding its annual luncheon at the Midland Hotel, Manchester, on March 5th, when the principal speakers will be Lord Eltisley (president of E.D.A.) and the Lord Mayor of Manchester (Alderman J. Toole).

Electrical Trading at Blackburn

At a meeting of Blackburn Town Council on February 4th a letter was read from the Blackburn Branch of the Electrical Contractors' Association urging the Corporation, in considering proposals for hiring electrical appliances to the public, to take into account the effect this would have on the businesses and employés of private electrical contractors. Ald. Culshaw moved back a resolution that the Council should adopt a simple hire scheme for heavy-duty domestic electrical equipment and apply for sanction to borrow £20,000 for the purchase of the necessary appliances. Simple hire, he contended, was a dangerous precedent. The Gas Department had appliances out to the value of about £48,000. Councillor Mottershead said he supported the scheme although he had opposed it in committee because he thought they might consider the alternative of ten years' hire-purchase. An overwhelming case had been made out for a simple hire scheme. In other towns such a scheme had proved successful. Unfortunately, Blackburn had Gas and Electricity Departments in close competition. He favoured a common undertaking. They could not turn down a sound financial scheme from the Electricity Department just because the Gas Department had not produced one equally sound. Electrical contractors were not greatly concerned about the sale of washing machines, &c. Their concern was whether the scheme would be extended to smaller apparatus. The Electricity Committee chairman had assured him this was not intended. Coun. Johnson (chairman of the Gas Committee) said he could produce evidence which might have caused the Committee to reconsider its decision. It was a dangerous procedure, and the Corporation's finances might suffer. Coun. Eddie said the proposal was financially sound and likely to be successful. It might adversely affect the Gas Department, but they had no right to prevent householders obtaining electrical appliances on the same reasonable terms as in neighbouring towns. The scheme was approved and application will be made to the Electricity Commissioners for sanction to borrow £20,000 for the purchase of electrical appliances.

An Extended Utensil Factory

Office and works extensions recently completed at the Trafalgar Works, Merton Abbey, London, S.W.19, of Corfield-Sigg, Ltd., embrace 20,000 sq. ft. of floor area and are actually three times the size of the older part of the factory, so that the visitor receives an impression of an entirely new factory. The works equipment is electrically driven throughout, but from the broader commercial point of view perhaps the greater electrical interest lies in the fact that the extensions have been made necessary by increased business on the electrical side. It will be recalled that the company was originally

established to take over the manufacture in this country of Sigg ground-base utensils for use on electric cookers. When we inspected the works recently we saw some fine examples of spinning lathes and stamping presses, both types of equipment catering for the one-piece body utensil. We were told that the stamping process is employed entirely for the necessarily higher grade ground-base ware. At the moment the company is not producing self-contained electrical equipment, but we saw a production model of a two-pint electric kettle which will probably be on the market shortly. It has a coiled tubular sheathed embedded immersion element loaded at 950 W, while in the head of the element outside the body of the kettle, is a simple automatic cut-out device with a bi-metal release for the spring-loaded switch.

Orders Recently Booked

The New Zealand Government has placed a contract with the British General Electric Co., Ltd., of Wellington, for over 130 G.E.C. floodlights for use with various coloured "Osira" lamps, the total value of the contract being over £3,500. These floodlights are to be used for illuminating the main Government buildings and the railway stations in Auckland, Wellington and Christchurch.

Employés of the Igranic Electric Co., Ltd., who have completed twenty-five years' service. Seated in the front row are (left to right), Col. B. I. Rolling (general manager), Miss I. E. Fowle, Mr. G. A. Mower (chairman), Miss V. J. Neave, and Mr. A. H. Mackley (chief engineer)

A complete mill for rolling hot and cold strip and tinplate is to be installed by Richard Thomas & Co., Ltd., at Ebbw Vale, and an important section of the plant will be manufactured by the General Electric Co., Ltd. At the Fraser & Chalmers Engineering Works the G.E.C. will produce approximately 3,000 tons of mechanical plant to drawings supplied by the United Engineering Co. of America. This machinery will consist of the cold rolling section of the scheme, which includes three skin pass mills (comprising six housings each of 56 tons), shearing line, and a number of coilers, decoilers, shears, tensioning device and all auxiliary apparatus in connection with the manufacture of cold roll sheet and tinplate. The electrical equipment, which is being manufactured at the Witton Works, Birmingham, includes the motors for the cold strip mill, of which the most important are three d.c. machines each of 1,500 h.p. These, together with a 400-h.p. d.c. motor, are supplied from a 3,500-kW synchronous Ward Leonard set. In addition, the electrical plant to be built at Witton includes a number or motors for the continuous hot strip mill, motor control gear, three 2,000-kVA transformers, two 11,000-V remote electrically controlled metal-clad switchboards, one of seventeen panels and the other of ten panels, and over 100 d.c. reversible steelworks motors for driving mill auxiliaries.

Social Events

Nearly 300 members of the Johnson & Phillips staff and their friends attended the annual staff dance at Woolwich Town Hall on January 29th. Once again the occasion was a general reunion for J. & P. engineers from all parts of the country. Members of the board also attended.

The annual staff dinner and dance of Ferranti, Ltd., was held on February 5th at the Midland Hotel, Manchester, 430 members of the staff and friends of the company being received by Mr. and Mrs. Vincent de Ferranti. The guests included Mr. and Mrs. P. J. Robinson, Mr. H. C. Lamb, Mr. and Mrs. Romero, Mr. Fennell, Mr. and Mrs. Hawkins, Mr. and Mrs. Brassington, and a large number of electrical and radio wholesalers. Among the messages of regret read by the chairman was a letter from Mr. C. P. Sparks, in the course of which he recalled that it was just over forty years ago since he first took up his position as manager of the then new works at Hollinwood. In proposing the toast of the "Ferranti Company," the Mayor of Oldham (Councillor Tweedale) produced the receipt of the first account from Ferranti's to the Oldham Corporation Electricity Department. It was dated 1894, and it revealed the interesting fact that in those days 10-A meters were sold at £6 10s. each. The Mayor also had another exhibit in the shape of a comptometer strip which made a roll of some yards in length, itemising the Oldham account with Ferranti since that date. This he formally presented to the chairman. Major Cooper responded and spoke of the advantages enjoyed by Ferranti employés in working for a firm which had always remained so exclusively a family concern, and retained the healthy and enterprising family spirit. The toast of "The Guests" was proposed by Mr. C. W. Bridgen. Replying for "The Guests," Mr. P. J. Robinson referred to a mention by the chairman of large transformer orders obtained from South Africa, and reminded the company that much nearer to home there was a city in which the capacity of Ferranti transformers installed totalled approximately a quarter of a million kVA. The toast of the "The Chairman" was proposed by Mr. G. L. Porter.

The Igranic Electric Co., Ltd., held its annual carnival last week at the Corn Exchange, Bedford. The event was organised by the company's Social and Sports Club, and over 500 were present, including Mr. G. A. Mower, chairman of the company, Mr. G. R. Thursfield and Capt. L. M. Paterson (directors), Col. B. I. Rolling (general manager), Mr. J. H. Enion (sales manager) and parties from the Sturtevant Engineering Co., Ltd., Bifurcated & Tubular Rivet Co. (associated companies), and members from the company's branch offices. During the evening the Club competition trophies were distributed by Mrs. Paterson, and long service awards (gold watch and signed testimonial) were made by Mr. Mower to twenty employés who have recently completed twenty-five years' service. Col. Rolling thanked the directors for purchasing the freehold of the sports field at Kempton, together with adjoining land for extension, totalling more than ten acres. Mr. A. H. Mackley thanked Mrs. Paterson and congratulated Mr. Mower on having attained his seventy-seventh birthday, presenting him on behalf of the Club with a cocktail shaker in the form of a dumbbell.

The annual staff social and dance of the North Somerset Electric Supply Co., Ltd., was held on February 5th. The programme included community singing, a feature of which was an "electric song," sung to the tune of "Clementine," the words being the joint efforts of several members of the staff.

The annual staff dinner and dance of the Telegraph Construction and Maintenance Co., Ltd., and of Submarine Cables, Ltd., took place at the Trocadero Restaurant on Tuesday last, when Mr. L. J. Ransom presided over a gathering of nearly 200. Following the loyal toast, the "T.C. and M. Co." was proposed by Mr. Edgar L. Watts, who said that in spite of recent changes the company's reputation for fair dealing remained. In responding, Mr. Colin F. Campbell referred with regret to their parting with the cable ship *Dominia*. Shareholders had gone without dividends for years, but the present price of their shares was an indication that better times were expected.

Mr. A. E. Foster proposed "Submarine Cables, Ltd.," stating that that company's hopes were being fulfilled; it was evident that submarine cables still had an important part to ply. In reply, Sir Geoffrey Clarke emphasised that cables were the most reliable means of communication. Messrs. Siemens and themselves had between them made and laid from 80 to 90 per cent. of the world's submarine cables. Mr. J. W. Dean proposed the health of the visitors, on whose behalf Mr. F. Selley responded. "The Ladies" was proposed by Mr. C. J. C. Padfield and Lady Clarke replied. "The Chairman" was proposed by Dr. E. W. Smith, Mr. L. J. Ransom making suitable acknowledgment. The remainder of the evening was devoted to dancing.

Electricity in London Flats

The account of the equipment in the "St. Regis" flats in our February 5th issue mentioned that the air conditioning plant for the public rooms and restaurant was installed by Utilities (Electric), Ltd., whereas this concern's correct trade name is Utilities (London), Ltd.

Eureka Electric, Ltd.

We have received a circular from the Eureka Electric Co., Ltd. (an associated company of A. Reyrolle & Co., Ltd.), outlining its future plans and policies. The company distributes its products only through specially appointed dealers, and has ceased to employ direct selling staff as canvassers or salesmen. It proposes to expand into the domestic electrical appliance market generally as and when the opportunity presents itself.

The Certification of Meters

The Electricity Supply (Meters) Act, 1936, requires that after an "appointed day" all new electricity meters and all meters taken off circuit must be certified as accurate by examiners before being brought into use. The Electricity Commissioners have sent a letter to all electricity supply

authorities pointing out that after the "appointed day" it will only be permissible for the meter examiners to certify meters which are of a construction and pattern approved by the Electricity Commissioners (or by the Board of Trade prior to 1920).

Undertakers should therefore take such steps as may be necessary to ensure that new meters used by them are of an approved type and that existing meters not of an approved type which are taken off circuit are replaced by meters of an approved type. Enclosed with the letter is a schedule showing the types which have been approved under the Electricity (Supply) Acts.

The names of the manufacturers which appear in the schedule are as follows:—A.E.G. Electric Co., Ltd.; Aron Electricity Meter, Ltd.; Bergmann Electric Co., Ltd.; British Electric Meters, Ltd.; British Insulated Cables, Ltd.; British Sangamo Co., Ltd.; Chamberlain & Hookham, Ltd.; Electrical Apparatus Co., Ltd.; English Electric Co., Ltd.; Ferranti, Ltd.; Korting & Mathiesen Electrical Co., Ltd.; Landis & Gyr, Ltd.; Measurement, Ltd.; Metropolitan-Vickers Electrical Co., Ltd.; Reason Mfg. Co., Ltd.; Siemens Bros. & Co., Ltd.; Siemens-Schuckert (Robert Hornby & Co., Ltd.); Smith Meters, Ltd.; Thompson & Co. (Rex Meters); and Venner Time Switches, Ltd.

With regard to certain other types of meters the manufacturers concerned have intimated that it is their intention to take the necessary steps to apply for approval in the near future. If undertakers have in use any types of meters which are not included in the schedule and desire to obtain further information in regard thereto, the Commissioners assume that the undertakers will in the first instance communicate direct with the particular manufacturers concerned. The "appointed day" has not yet been fixed but it is hoped that it will be fixed in the early part of this year.

Ex-British Westinghouse Association

The eighteenth reunion dinner of the ex-British Westinghouse Association will be held on March 12th at the Trocadero Restaurant, London. Tickets can be obtained from Mr. L. S. Hawes, 14, Woodleigh Gardens, Streatham, S.W.16.

Prices of Materials

The following prices are only general, and they may vary according to quantities and other circumstances:—

	Price. February 10th	Fortnight's Inc. or Dec.
CHEMICALS, ETC.		
a Acid, Oxalic ... ... per cwt.	50s.	—
a Ammoniac, Sal ... ... per ton	£36	—
a Ammonia, Muriate (large crystal) ... „	£18 10s.	—
a Borax ... ... „	£17	—
a Copper, Sulphate ... ... „	£15 10s.	—
a Potash, Chlorate ... ... per lb.	3¾d. to 4¾d.	—
a „ Perchlorate ... ... „	6d.	—
a Shellac ... ... per cwt.	£4 18s.	—
a Sulphur, Commercial ... ... per ton	£11	—
a „ Roll ... ... „	£11	—
a Soda Chlorate ... ... per lb.	3¼d. to 3¾d.	—
a „ Crystals ... ... per ton	£5 to £5 5s.	—
a Sodium Bichromate, casks ... ... per lb.	4d. nett.	—
METALS, ETC.		
b Aluminium, Ingots ... ... per ton	£100 to £105	—
b „ Wire ... ... per lb.	1/1 to 1/9	—
b „ Sheet and Foil ...	1/3 to 2/9	—
p Babbitts Metal and Anti-friction Metals—		
Grade I ... ... per ton net	£213	£1 dec.
Grade II... ... ... „	£151	£3 inc.
Grade III ... ... „	£85	£8 inc.
c Brass (rolled metal 2" to 12" basis) per lb.	9¼d.	¼d. inc.
c „ Tubes (solid drawn) ... ... „	11¼d. to 1/-	¼d. inc.
c „ Wire, basis ... ... „	9¼d.	¼d. inc.
c Copper Tubes (solid drawn)... ... „	1/1¼d.	¼d. inc.
g „ Bars (best selected) ... per ton	£87	£2 inc.
g „ Sheet ... ... „		
g „ Rod ... ... „		
d „ (Electrolytic) Bars ... ... „	£57	—
d „ „ Wire Rods ... ... „	£64	—
d „ „ H.C. Wire ... per lb.	9 5/8d.	—
f Ebonite Rod ¼" dia. & up ... ... „	1/8 to 2/2½	2d. to 2½d.inc.
f „ Sheet ⅛" thick & up ... ... „	1/4 to 1/8	1d. to 2d. inc.
n German Silver Wire, Nos. 1 to 12 ... „	2/2	—
h Gutta-percha, fine ... ... „	nom.	—
h India-rubber, Para-fine ... ... „	1/2	—
i Iron, Pig (Cleveland, No. 3) ... per ton	67/6	—
i „ Wire galv. No. 1, P.O. Qual.... „	£20	—
g Lead, English Pig ... ... „	£20	10s. inc.
g Mercury ... ... per bot.	£14 5s.	—
c Mica (in original cases) small ... per lb.	9d. to 1/6	—
c „ „ „ medium ... „	5/- to 10/-	—
c „ „ „ large ... „	10/6 to 17/6 up	—
p Phosphor Bronze, plain castings ... „	1/2½d.	½d. inc.
p „ „ drawn bars & rods ... „	1/2d.	—
p „ „ rolled strip & sheet „	1/1d.	—
p „ „ wire ... ... „	1/2½d.	½d. inc.
o Platinum ... ... per oz.	£14	£2 5s. inc.
d Silicium Bronze Wire ... ... per lb.	9 5/8d.	—
g Spelter ... ... per ton	£23 1 3	£1 3 9 inc.
r Steel, Magnet, in bars ... ... per lb.	7¾d.	—
g Tin, Block (English) ... ... per ton	£227 15s.	£1 10s. inc.
n „ Wire, Nos. 1 to 16 ... ... per lb.	4/1	—

Quotations supplied by:—

a G. Boor & Co.
b The British Aluminium Co., Ltd.
c Thos. Bolton & Sons, Ltd.
d Frederick Smith & Co.
e F. Wiggins & Sons.
f India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
g Henry Gardner & Co., Ltd.
h Edward Till & Co.
i Bolling & Lowe.
n P. Ormiston & Sons.
o Johnson Matthey & Co.
p C. Clifford & Sons, Ltd.
r W. F. Dennis & Co.

The above table is published here fortnightly. In alternate issues, in which it does not appear, the latest prices of copper, silicium bronze wire, lead, rubber, tin and spelter, up to the time of going to press, are given in our "Business Notes."

The Electric Illumination Exhibition

In connection with the Electric Illumination Exhibition which is now being held at the Science Museum, South Kensington, the British Electrical Development Association has produced an effective showcard and a poster stamp with a rainbow design which it is arranging to distribute throughout the Greater London area to draw attention to the exhibition.

Trade Announcements

The branch of the British General Electric Co., Ltd., at Christchurch, New Zealand, has been removed from Hannaford Building, Worcester Street, to Magnet House, Gloucester Street, Christchurch.

Homefyre, Ltd., is removing this week-end to 66-72, Brewery Road, Caledonian Road, N.7 (telephone: North 3046).

Bulgarian Tariff Modifications

A Bulgarian law, effective as from September 1st, 1936, provides for a large number of modifications in the Bulgarian Customs Tariff. The duties under the tariff are fixed in gold leva, and in general when paid for in paper leva are subject to a coefficient of 2,700 per cent., *i.e.*, 27 paper leva will be paid for one gold leva. From a list published in the *Board of Trade Journal* we have extracted the following:—

	Import Duty	
	Former	New
	Leva (gold) 100 kg.	Leva (gold) 100 kg.
Dynamo-electric machines, motors, transformers, starting switches, alternators, rheostats, condensers, current regulators, electric pumps, and ventilators, cranes, electro-magnetic apparatus, including their parts, weighing each:—		
(*a*) 8,000 kg. and upwards	100 or 8% *ad val.*	30
(*b*) 3,000–8,000 kg....		40
(*c*) 500–3,000 kg.		50
(*d*) 25 up to 500 kg.		60
(*e*) 12 up to 25 kg.		70
ex (*e*) Dynamos and parts, weighing 12–25 k.g. each		50
(*f*) Up to 12 kg.		100
Galvanic elements, including their parts	30	60
New Note.—Accumulators and their parts pay half the rate of duty provided for under this number.		
Wireless apparatus, valves and parts	800	400
Electric refrigerators	150	35
Electric cables (real net weight)	60	50
Materials for electrical installations, and parts thereof:		
(*a*) For high-tension current, such as levers, automatic switches, distributing. switches, insulators, etc.	200	40
(*b*) For low-tension current, such as cut-outs, switches, contacts, junction boxes, sockets and the like		200

New Year Books

The 1937 edition of the "*Mechanical World* Electrical Year Book" (Emmott & Co., Ltd., 1s. 6d. net) is now available. With the increasing attention which is being paid to lighting in relation to health and safety, one aspect of this subject has received special attention and the section on lighting circuits and switching has been given detailed revision. The tables relating to electrified railways have been brought up to date, and other sections have also been revised to include newly ascertained data. The "*Mechanical World* Year Book" has also been published (1s. 6d. net) and has been revised to conform to recent developments. A new article deals with the design and manufacture of toothed gearing.

Catalogues Wanted

The Commercial and Technical Department of the Leicester City Libraries is engaged in building up a collection of manufacturers' catalogues, and firms are invited to send to the Director a complete set of their current publications which will be indexed in the card catalogue, both under the firm's name and the productions in which they specialise.

I.F.S. Electrical Imports

December last proved an active month as regards imports of electrical machinery and cognate material into the Irish Free State a total of £100,171 being attained as compared with £85,856 in December, 1935. The appended table gives the details of the imports during the whole of the past year as compared with 1935. It will be seen that eight of the scheduled items underwent an increase and four a decrease.

	1935. £	1936. £
Electric motors	46,327	53,131
Other electrical machinery	199,869	211,204
Dry batteries and parts	31,761	21,570
Electric lamp bulbs	70,626	50,158
Electric lighting accessories, fittings and parts	78,911	79,253
Electric wires and cables, insulated	85,165	98,734
Telep. and teleg. apparatus	35,075	45,874
Radio receivers, complete	126,917	111,796
Radio-gramophones, complete	5,898	3,079
Other radio apparatus, fully or partly assembled	6,693	10,360
Radio parts and accessories	90,939	118,717
Other electrical goods and apparatus ...	268,424	315,493
Totals	£1,046,605	£1,119,369

New Catalogues and Lists

Sturtevant Engineering Co., Ltd., 147, Queen Victoria Street, London, E.C.4.—"Electrostatic Precipitation" is the title of a new booklet, while industrial process ventilation is dealt with in publication No. 1246.

"Beeantee" Illuminations, Ltd., 88, Goswell Road, London, E.C.1.—A catalogue of Coronation decorations and signs.

Siemens Electric Lamps & Supplies, Ltd., 38/39, Upper Thames Street, London, E.C.4.—Particulars and prices of cables to the new C.M.A. standards are given in catalogue No. 200.

London Aluminium Co., Ltd., Westwood Road, Witton, Birmingham, 6.—A leaflet dealing with a new "Diamond" kettle.

John Moores & Co., Ravald Street Works, Salford, 3.—A price list of electrical insulating materials.

A.C.E.C., 56, Victoria Street, London, S.W.1.—A stock list for January.

Key Engineering Co., Ltd., 4, Queen Victoria Street, London, E.C.4.—A new catalogue of "Key" fibre ducts.

Howells (Electric Motors), Ltd., Vale Place Works, Hanley, Stoke-on-Trent.—A catalogue of a.c. motors up to 60 h.p. and a stock list.

Drake & Gorham Wholesale, Ltd., 77, Long Acre, London, W.C.2.—A leaflet showing Coronation lampshades.

Elliott Brothers (London), Ltd., Century Works, Lewisham, London, S.E.13.—Reprinted sheets for the measuring instrument catalogue, including a.c. switchboard instruments, the "Weameter" test set, and the Shotter remote control transmission system.

I.C.I. Metals, Ltd., Kynoch Works, Witton, Birmingham, 6.—A new edition of "Broduit Copper Conduit for Electric Wiring," including the results of recent experience and a list of installations already carried out.

Bankruptcy Proceedings

S. Howarth, 7, Clayton Street, Denton, Lancs, lately carrying on business at 583, Gorton Road, Reddish, Stockport, electrician. This debtor attended at the Court House, Stockport, recently for his public examination. It was reported that he had been trading at Gorton Road for three years, and was previously engaged in another business at Reddish Lane. Over the whole of his trading his losses amounted to £1,000. The examination was closed.

G. F. Jenkins, 24, Browning Road, Enfield, electrician.—This debtor filed his own petition and he attributed his failure to heavy loss on a contract undertaken in 1933, keen competition and insufficient profits since 1933 to meet overhead expenses and personal drawings. A statement of affairs which has been lodged shows liabilities of £707 with assets of £25, leaving a deficiency of £682.

L. Smethurst, electrical and radio engineer, 155, Footscray Road, Eltham, S.E.9, late of Southampton.—Receiving order made February 1st on debtor's own petition.

P. D. Watkins, radio engineer, 48, High Street, Criccieth.—First meeting February 12th at the Official Receiver's office, St. Peter's Churchyard, The Cross, Chester. Public examination March 12th at the Court House, Portmadoc.

S. J. Miles, radio and electrical engineer, 134, Queen Victoria Road, Coventry.—First and final dividend of 1s. 5½d. in the £, payable February 9th at 9-11, High Street, Coventry.

T. S. Cocks, wireless dealer, 219, Milton Road, Portsmouth.—First and final dividend of 20s. in the £, plus 4 per cent. statutory interest, payable February 12th at 87, High Street, Portsmouth.

J. Jennison, electrical engineer, 133, Abbey Road, Torquay.—Receiving order made January 28th on a creditor's petition.

J. H. Maddox (lately trading as Imperial Electrical Supplies Co.), electrical accessories dealer, 14, Whitecross Place, Finsbury Pavement, E.C., now residing at 9, Adolphus Road, Finsbury Park, N.—Application for discharge to be heard on February 26th at Bankruptcy Buildings, Carey Street, W.C.2.

J. Davies (Davies & Co.), wholesale radio and gramophone factor, 5, Russell Street, Park Row, Leeds.—Last day for receiving proofs for dividend February 16th. Trustee, Mr. J. J. Penny, Victoria Chambers, South Parade, Leeds.

G. F. Richards, wireless and electrical dealer, 1, Peel Street, Kidderminster.—Supplemental dividend of 14s. 0⅝d., together with interest at 4 per cent., payable February 10th at 1, Priory Street, Dudley.

Company Liquidations

Featherstone Wholesale Radio-Elec, Ltd., 109, West Hill, St. Leonards-on-Sea. The statutory meeting of creditors was held recently at the offices of Messrs. Corfield and Cripwell, Balfour House, Finsbury Pavement, E.C.2, when it was reported that the shareholders had met and had nominated Mr. W. A. J. Osborne as liquidator. A statement of affairs as at January 29th last showed liabilities of £1,977, of which £1,505 was due to the trade and sundry creditors, while Mr. R. Featherstone was a creditor in respect of loans amounting to £472. The net assets were £1,448, leaving a deficiency so far as the unsecured creditors were concerned of £530. The creditors confirmed the voluntary liquidation of the company with Mr. Osborne as liquidator, and a committee of inspection was appointed consisting of the representatives of the Ever Ready Co., Ltd., General Electric Co., Ltd., and Beethoven Radio, Ltd.

Borough Electric Lighting Co., Ltd.—Meeting March 15th at the Oddfellows Hall, Brough, to receive an account of the winding-up by the liquidator, Mr. J. F. Hopkinson.

International Electrical Supplies Co., Ltd.—Meeting March 2nd at Balfour House, Finsbury Pavement, E.C.2, to receive an account of the winding-up by the liquidator, Mr. W. A. J. Osborne.

Rheostatic Co., Ltd.—Winding up voluntarily. Liquidator, Mr. H. C. E. Miller. The registration of a new company with the same title, to take over the business and assets of this company, was recorded in our last issue.

Whitaker Electric Co., Ltd.—Meetings February 15th at Bush Lane House, Cannon Street, E.C., to receive an account of the winding-up by the liquidator, Mr. H. Rule.

Dissolution of Partnership

Smethwick Radio Supply & Service, radio dealers, 71, High Street, Smethwick.—Messrs. W. J. Johnson and W. G. Johnson have dissolved partnership. Mr. W. G. Johnson will attend to debts and carry on the business.

Electricity Supply

Lighting, Domestic, Power

Aberdeen.—NO CHOICE.—Following a lively debate the Finance Committee has decided to adhere to its decision (by 22 votes to 11) that in Council houses electricity shall be used for lighting and gas for cooking purposes and for hot-water boilers. The opposition maintained that the tenants should be free to have whichever they preferred.

Ashington (Northumberland).—STREET LIGHTING.—After having had the matter under consideration for two years, the Urban District Council has agreed to introduce, as an experiment, an improved street-lighting system.

Austria.—SUPPLY AMALGAMATION.—Both the public (local authorities) and the private electricity supply undertakings in Austria have formed themselves into a common union for the promotion of joint interests and especially to counteract the falling off in the demand which is ascribed to the high prices charged for energy.

Billingham-on-Tees.—STREET LIGHTING.—Plans for the lighting of Bellasis Lane Bridge and approaches with electricity have been approved by the Urban District Council. Underground cables will be used and the cost will be £393.

Blackburn.—INDUSTRIAL SUPPLY.—A supply of electricity to the Silk Velvet Manufacturing Company, Stancliffe Street Mill, Griffin, has been authorised by the Town Council.

ELECTRIC SHOW HOUSES.—Facilities have been given to the Electricity Department to arrange a series of show houses on the Brownhill estate to demonstrate the benefits of electricity to tenants on the estate. Similar facilities will also be given on other housing estates.

Blackpool.—REDUCTION AT MARTON VETOED.—A proposal that a 10 per cent. extra charge for electricity in Marton, a suburban district added to Blackpool in 1934, should be withdrawn after April has been rejected by the Town Council.

NEW SWITCHBOARD.—Tenders are to be obtained for a 6,600-V switchboard.

PREPAYMENT METER TARIFF.—In connection with a decision that occupiers of all houses of a net rateable value of £14 or under shall be granted the option of having prepayment meters installed, the Electricity Committee has decided that, for a period of twelve months, the following tariffs shall be charged for electricity consumed through prepayment meters: Lighting: 4½d. per kWh (outside the county borough, 5d.); heating: For the whole of the area of supply, 1d. per kWh.

Bradford.—MAINS EXTENSIONS.—The Electricity Committee has voted a further sum of £20,000 to cover the cost of mains extensions.

Bristol.—PUMP HOUSE.—In connection with a scheme to obtain a fresh-water supply for the Portishead power station the Electricity Committee is to erect a pump house at a cost estimated at £8,100.

LOANS.—The Electricity Committee is seeking sanction to borrow £400,000 for mains and sub-station equipment, £250,000 for mains and £60,000 for a distribution centre.

Burnley.—NEW FEEDER.—The Electricity Committee is applying for consent to borrow £5,000 for laying an extra high-voltage feeder and the purchase of the necessary transformers and switchgear for a supply of electricity to the premises of Platers & Stampers, Ltd., Colne Road.

Canterbury.—AMENDED IN FAVOUR OF ELECTRICITY.—At a recent City Council meeting the Public Health Committee recommended the installation of a new gas-operated heating stove, with additional racks for a drying chamber, in the Isolation Hospital, but the Council approved an amendment that the words "gas operated" should be changed to "electrically operated."

Cardiff.—BETTER LIGHTING.—Arrangements have been made for an improvement in the lighting of Cowbridge Road at a cost of 1,200.

Carlisle.—MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £1,750.

SUPPLY TO CASTLE CARROCK.—Sanction to borrow £7,397 in connection with the provision of a supply of electricity to Castle Carrock and district has been obtained by the Electricity Committee.

Castleford.—SUB-STATION.—The Electrical Distribution of Yorkshire, Ltd., proposes to erect two sub-stations in the district.

Colchester.—SUPPLY TO BRITANNIA WORKS.—An a.c. supply is to be afforded to the Britannia Works, involving the laying of a high-voltage cable, which will ultimately form the first section of a feeder to a new sub-station. The estimated cost of the work is £1,300.

Corby.—OVERHEAD LINES.—After lengthy discussion Kettering Rural District Council has approved the erection of overhead lines to form part of a high-voltage line from Leicester to Corby. The route has been revised by the C.E.B. in consequence of objections by interested persons.

Derby.—LIGHTING IMPROVEMENTS.—Details of public lighting developments from April, 1936, to January, 1937, were given in a report presented to the Electricity Committee recently. It showed that 2¾ miles of road lighted for the first time in-

cluded 1,120 yd. in Broadway by 90-W sodium lamps. In Osmaston Park Road forty-three sodium lamps had been installed, and twenty-nine in Harvey Road. During the period 387 gas lamps had been converted to electricity.

Dewsbury.—SUB-STATIONS.—Application for a loan of £1,600 has been made for the erection of a sub-station in Knowles Hill Road in connection with the supply to Dewsbury Moor, and the installation of an additional transformer in the sub-station at the electricity works.

Dorchester.—PROPOSED RURAL SUPPLIES.—The Rural District Council has received from the Weymouth Corporation a map showing the proposed route of a line for supplying electricity to Abbotsbury, Portlesham, Littlebredy, Winterborne Steepleton and Winterborne St. Martin. The possibility of a supply being afforded to Fleet and Langton Herring is to be considered.

East Ashford.—RURAL SUPPLIES.—The Kent Electric Power Co. has under consideration the supplying of electricity to various villages in the area of the East Ashford Rural District Council which is pressing for supplies.

Eccles.—DEVELOPMENT PROGRAMME.—The Electricity Committee has arranged the following five-year programme: Provision of two sub-stations and low-voltage four-core distributing mains for the Westwood Park estate (£10,200); a new extra high-voltage feeder and alterations to switchgear at the Mount Street sub-station (£2,250); provision of a sub-station and four-core distributing mains for the Gilda Brook Road and Church Road area (£2,500); provision of a sub-station and equipment at Monton Bridge to provide for a larger kVA input to the extra high-voltage ring main system by merging the two ring mains (£1,200); extension of low-voltage four-core distributing mains in Ellesmere Park (part), Liverpool Road (part), Franklin Street and Shakespeare Crescent (part) (£1,850).

NEW CABLES.—Following an investigation of the existing layout of the distribution system on the Westwood Park estate the Electricity Committee is to have the whole network re-cabled at a cost of £2,749.

Fakenham.—ELECTRIC LIGHTING.—The town will be lighted by electricity for the next five years as the Council has accepted the tender of the East Anglian Electric Supply Company. There were two votes for gas and ten for electricity.

Folkestone.—WIRING AN ESTATE.—The consent of the Minister of Health has been received to the borrowing of £4,443 in connection with the provision of electric lighting and power supplies to houses in the Canterbury Road estate.

Gateshead.—DUPLICATE SUPPLY.—The Town Council has approved a proposal of the Mental Hospital Committee to accept the offer of the Newcastle and District Electric Lighting Co. to provide a duplicate supply of electricity from two separate feeders and install a sub-station at the Mental Hospital, Stannington.

Glasgow.—MAINS.—The Electricity Committee has agreed to the laying of mains at a cost of £21,014.

ELECTRIC CRANES.—The Clyde Trust is installing four electric cranes, each of five tons capacity, at Princes Dock.

ELECTRICITY FOR PRINTING WORKS.—It is suggested that the electrical installation work at the Corporation's new £34,000 printing works shall be done by the Electricity Department.

Grantown.—CHEAPER ELECTRICITY.—An agreement has been made with the Grampian Electricity Supply Co. relating to the electricity tariff, the charge being reduced from 10d. to 8d. per kWh.

Hereford.—STAND-BY PLANT.—The Water Committee has asked the city surveyor to submit a scheme for the provision of stand-by plant to be used in the event of a failure in the supply of electricity.

Hove.—HIGH-VOLTAGE CABLES.—The electrical engineer recommends that the submarine cables recently laid across Shoreham Harbour shall be extended by 11,000-V underground cables at a cost of £24,294.

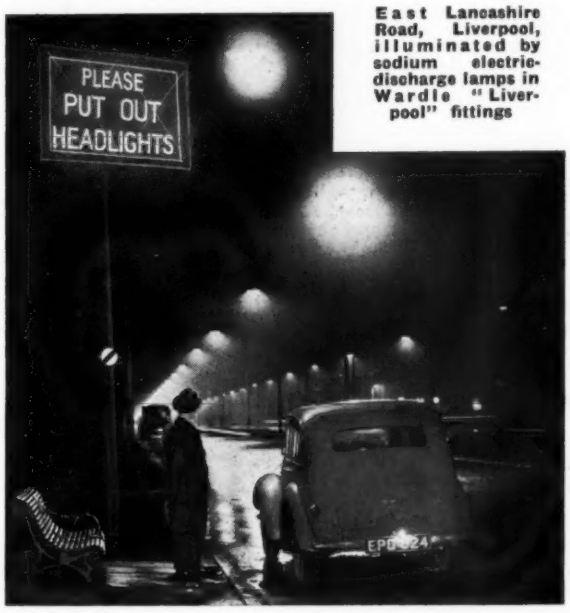
Hull.—REDUCTIONS IN TARIFFS.—As already announced, the electricity undertaking is to devote £10,000 of its profits to reducing charges and abolishing meter rents. The engineer and general manager (Mr. J. N. Waite) recommends the withdrawal of the additional charges made in respect of the prepayment meter system. This would mean, in the case of the flat-rate prepayment meters, the withdrawal of the additional ½d. per kWh, and, in the case of the cooker domestic prepayment meters, the withdrawal of the accommodation fee of 5s. per year. Other recommendations are the withdrawal of the additional area secondary charge on all electricity sold outside the Hull area; in the case of bulk power consumers the present coal clause figure of 0.006d. per kWh for each 6d. above the basic price of 10s. per ton will be reduced to 0.005d. per kWh, and in the case of small power consumers there will be a revision of the existing power scale in order to make uniform the charges for d.c. and a.c. supplies. A grant of £1,000 is to be made to the Coronation Committee towards the cost of the celebrations.

Jarrow-on-Tyne.—NEW CABLES.—The Town Council has approved plans of the North-Eastern Electric Supply Co., Ltd., for the laying of cables in York Street and Dene Terrace, Jarrow.

ELECTRICITY FOR SCHOOLS.—Electricity is to be installed at the Grange, Dunn Street and Bede Burn Council Schools at a cost of £715.

Leeds.—ELECTRIC-DISCHARGE LIGHTING.—The following systems of lighting for Torre Road transport depôt have been adopted: Omnibus section, sodium-discharge lamps (£660); tramways section, mercury-discharge lamps (£320).

Liverpool.—IMPROVED MAIN ROAD LIGHTING.—Special Wardle "Liverpool" No. A151 lighting fittings, designed by Mr. P. J. Robinson, the city electrical engineer, have been installed by the Wardle Engineering Co., Ltd., in East Lancashire Road. Philips "Philora" 150-W sodium lamps are



East Lancashire Road, Liverpool, illuminated by sodium electric-discharge lamps in Wardle "Liverpool" fittings

used. It will be observed from the accompanying illustration that motorists are requested to switch off their headlights.

Lochaber.—POWER STATION EXTENSIONS.—The British Aluminium Co., Ltd., has decided to extend through its subsidiary companies, the Lochaber Power Co. and the North British Aluminium Co., Ltd., the productive capacity of the Lochaber works by utilising the reserves of water which have been made available by the construction of the second stage of the Lochaber power scheme. This stage will utilise the head waters of the Spey, the water being taken into Loch Laggan, through a tunnel into Loch Treig, and then through the 15-mile-long main tunnel (which runs through a shoulder of Ben Nevis) to its outlet near Fort William.

London.—SOUTHWARK.—"Free" wiring is to be carried out at a cost of £708.

Louth.—SUB-STATIONS.—The Electricity Committee is to borrow £7,000 for the erection of three sub-stations.

Norwich.—SUPPLY EXTENSIONS.—The Corporation is planning extensions of its supply to villages near Dereham, including Garvestone.

Nottingham.—CHEAPER ELECTRICITY.—An intimation that when the annual accounts are available the Electricity Committee will further consider a reduction in charges to domestic tariff and flat rate consumers was given by the chairman of the committee at a recent City Council meeting.

Retford.—EXTENSIONS.—The Town Council is to apply for sanction to borrow £1,500 to provide electricity to Scrooby; also £18,500 for mains and services, £6,000 for meters and £6,500 for "free" wiring.

Rotherham.—SPECIAL CHARGE FOR REFRIGERATORS.—The charge for electricity for refrigerators installed in business premises has been fixed at 1d. per kWh.

Russia.—MORE HYDRO-ELECTRIC DEVELOPMENTS.—Plans for the construction of a canal to connect the Rivers Don and Volga have recently been approved by the Soviet Commissariat of Water Transport and the State Planning Commission. The linking of these two rivers is regarded as one of the biggest schemes of its kind in the world, and comparable with the construction of the Panama Canal. As a result of the raising of the Upper Don the difference between its level and that of the Volga will be 236 ft., the waters released from one river to the other being harnessed to drive the turbines of electric power stations. The scheme embodies the construction of three stations with a total capacity of 580,000 kW, equal to that of the Dniepr hydro-electric station. One of these, the Donskaya, will be erected at the point where the waters from the Don Reservoir empty themselves into the Lower Don; the second station, Dono-Volzhskava, will be built where the waters from the Don Reservoir flow into the Sarpinsk Reservoir; and the third, the Volzhskaya station,

will be situated at Krasno-Armeisk, where the Sarpinsk Reservoir waters flow into the Volga River.

South Shields.—TARIFF CHANGES.—Approval has now been given by the Town Council to a recommendation of the Electricity Committee for the modification of electricity tariffs.

Speyside.—ELECTRICAL DEVELOPMENT.—The Grampian Electricity Co. has now almost completed the installation of electricity in Garmouth and Kingston, on Speyside. Several houses and shops in Church Street, Garmouth, are now equipped with electricity, and the company hopes to finish the work in the other streets in the course of a week or two.

Stretford.—EXTENSIONS.—The Electricity Board is to borrow £48,743 for extensions.

BETTER STREET LIGHTING.—The Highways Committee proposes to improve the lighting of the main roads in the district at a cost of £10,000.

Torquay.—SUPPLY EXTENSION.—The Electricity Committee is to provide a supply of electricity to the premises of the Pochin Ball Clay Co., Ltd., at Highweek, Newton Abbot.

Uttoxeter.—NEW SUPPLIES.—Approval has been given to an extension of the electricity line to Bramshall, and the Urban District Council has raised no objection to the Burton authority affording a supply of electricity to Newborough and Draycott-in-the-Clay.

Walsall.—SWITCH-HOUSE.—A scheme for the erection of a switch-house at Birchills at a cost of £28,500 has been passed by the Electricity Committee.

Wallsend-on-Tyne.—BETTER STREET LIGHTING.—The Town Council proposes to convert the existing 300-W lamps in Coast Road to 500 W. The North-Eastern Electric Supply Co., Ltd., has been asked to submit an estimate of the cost.

Weston-super-Mare.—CHEAPER ELECTRICITY.—As from the end of the December quarter last the price of electricity for lighting has been reduced to 5½d. per kWh for the first 100 kWh per quarter and 4d. beyond. The combined domestic tariff "unit" charge is also reduced from ¾d. to ½d., a discount of 5 per cent. for prompt payment of accounts applying in both cases.

Winchester.—OVERHEAD LINES.—The following applications for permission to erect overhead lines have been received by the Rural District Council: The Southampton Electricity Department at Netley Hill estate, Hedge End, and Old Netley; the Mid Southern Utility Co. at Headbourne Worthy and Cheriton village; the West Hants Electricity Co. at Hocombe Lane, Hursley; and the Wessex Electricity Co. at Littleton and Sparsholt. The Mid-Southern Utility Co. has also made application for consent to the erection of a sub-station at New Farm Road, Alresford.

Wolverhampton.—ELECTRICITY FOR WATERWORKS.—As the Water Committee is to reconstruct the Cosford waterworks the Electricity Committee is to proceed at once with a scheme for the laying of cables to afford a supply of electricity at Cosford.

NEW MAINS.—At a cost of £1,114 the Electricity Committee is to provide a group feeder at Commercial Road, and it also proposes to extend mains to the Spring Hill estate, Penn, and to Moselet Court (£2,250) and provide a sub-station at a new public hall (£1,688).

Traction

Czechoslovakia.—UNDERGROUND RAILWAY FOR PRAGUE.—Plans have been approved for an underground railway in Prague, the length of which is to be about fifteen miles. There will be three lines and the cost of construction will be about £7,000,000. It is hoped to have the railway ready for the opening of an exhibition which is to be held in Prague in 1942.—*Reuter*.

Gateshead.—OPTION TO PURCHASE.—The Town Council has decided to exercise its option to purchase the undertaking in the Gateshead district only of the Gateshead and District Tramways Co. It is understood that the Council favours giving consideration to the substitution of trolley-buses for trams. This would cost about £200,000. The Gateshead and District Tramways Co. operates over 12½ route-miles through Dunston, Gateshead and Felling, and possesses sixty-six tramcars.

Germany.—5,000-H.P. LOCOMOTIVE.—In readiness for the opening of the Nürnberg to Leipzig main line now being electrified the German State Railway is developing an express electric locomotive with a one-hour rating of 5,000 h.p. It is to be capable of attaining a speed of 110 m.p.h. and of hauling a 360-ton train up the long 1-in-40 grades in Thuringia at from 37 to 40 m.p.h. without assistance.

Glasgow.—NEW TRAMS.—A proposal to add 100 new streamlined tramcars to the civic transport fleet has been approved by the Corporation. The bodies are to be constructed at the Corporation works and private firms will be invited to tender for the bogies and the electrical equipment.

Hampshire.—ELECTRIFYING THE PORTSMOUTH LINE.—The electrification of the Southern Railway line to Portsmouth is in such a forward state that an electric service to Witley and Fratton is considered possible by the beginning of March and a full electric service to Portsmouth before the end of May.

Italy.—MILAN RAILWAY CHANGES.—Certain of the 600-V d.c. lines of the Italian State Railways running from Milan towards Lake Como are to be realigned and transferred underground near the city in order to form the nucleus of a Milan Metro system.

London.—PREFERENCE FOR ELECTRIC TRAINS.—Analysing the traffic at London Bridge (Southern Railway) Station the *Railway Gazette* finds substantial evidence of passengers' preference for electric trains. In the Eastern section of the station there is a large transfer traffic on platforms 4, 6 and 7 between incoming trains going to Charing Cross and Cannon Street. To the former station, especially, one frequently has the choice of a main line steam train or one of the normal suburban electrics. Should the two arrive together the steam train takes about 10 per cent. of the passengers and the electric about 90 per cent., and of the 10 per cent. that go to the steam train some nine-tenths are old ladies and gentlemen who rarely visit the station. This is partly due, no doubt, to the faster schedule speed of the electric train. The attraction of cleanliness is shown by the number of persons who will not use a steam train between London Bridge and Charing Cross, although an electric train may not be signalled. They prefer to lose perhaps three or four minutes, walk over the bridge to another platform, and travel clean, despite a larger number of passengers for a given number of seats.

Plymouth.—TROLLEY-BUSES PROPOSED.—A recommendation for the abandonment of certain tramways and the substitution of trolley-bus services at a cost of £50,000 for vehicles, £18,000 for overhead lines, and £4,000 for cables, has been approved by the Transport Committee.

Communications

Egypt.—PROPOSED SHORT-WAVE STATION.—The construction of a short-wave broadcasting station to enable Moslems all over the world to hear excerpts from the Koran being read in Cairo is now being considered by the Egyptian Government, according to *Reuter* (Cairo). The power of the station will be 15 kW. Plans for the construction of a 100 kW long-wave station are also under consideration.

Great Britain.—POST OFFICE SURPLUS.—The Post Office reports a net surplus of £12,539,110 as a result of its operations during the year ended March 31st last; this is the largest yet recorded. Inland telegraph messages increased by 26.1 per cent. to 44,490,000; trunk telephone calls by 15.5 per cent. to 97,685,000, and local calls by 8 per cent. to 1,721,500,000. The 6d. telegram produced substantially more business, but not sufficient to cover the initial loss of revenue and the higher working expenses. Income from radio licences increased from £3,484,100 to £3,785,700.

TELEVISION.—Following the recommendation of the Television Advisory Committee that the different technical standards of television transmission should be terminated, the following standards (used by the Marconi-E.M.I. system) have been approved by the Postmaster-General:—405 lines interlaced, 50 frames per second and 30:70 ratio of synchronising impulse to picture.

Upon this announcement being made Electric & Musical Industries and the General Electric Co., Ltd., stated that they have reduced the prices of their television receivers from 120 and 95 guineas to 80 and 60 guineas, respectively.

India.—TELEPHONY.—Our correspondent reports from Bombay that the Standing Finance Committee has approved the telephone extension programme for 1937 involving a total expenditure of Rs. 88 lakhs. It includes the installation of multi-channel equipment between Bombay and New Delhi, and the provision of a stand-by circuit from Agra to Bombay, the installation of a multi-channel carrier between Bombay and Madras, the installation of two copper wires between Bombay and Poona, which will constitute an alternative circuit to that now in use, the construction of an automatic exchange at New Delhi, the erection of a telephone line between Chakdara and Chitral, and new telephone connections in Poona and Kolhapur districts in the Bombay Presidency.

A *Reuter* report from New Delhi states that long-distance telephone calls passing through the principal trunk exchanges of India during the first week of this year numbered 35,000, as compared with 12,000 during the same period of 1936. Figures for the following weeks have exceeded all previous records by over 5,000. This speedy growth in the popularity of trunk calls is taxing the capacity of the existing telephone system, although it was only installed five years ago.

Syria.—TELEPHONE SERVICE EXTENSION.—The telephone service with Syria, which was restricted to Beirut, has been extended to Damascus.

Graphical Symbols for Communication

The 1934 B.S.S. 530, graphical symbols for telephony, telegraphy and radio communication, has been revised and brought into line with the International Electrotechnical Commission's list of symbols (I.E.C. Publication No. 42-1936). In conformity therewith the symbols have been arranged in five sections, (1) common to tele-communications, (2) particular to telephony, (3) particular to telegraphy, (4) particular to radio, and (5) appendix, containing I.E.C. symbols materially different from the British Standard symbols, or which are not required in Great Britain. Copies of the revised Specification (No. 530-1937) can be obtained from the British Standards Institution, 28, Victoria Street, S.W.1.

Contract Information

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Contracts Open

Amble.—March 8th. U.D.C. Electricity Department. Transformers and other apparatus for the Morwick water pumping scheme. (February 5th.)

Argentina.—BUENOS AIRES.—March 4th. National Sanitation Works Department. Five electrically driven pumping sets. (T.Y. 2293.)*

March 15th. Four electrically driven pumping sets. (T.Y. 2294.)*

Australia.—BRISBANE.—March 30th. City Electric Light Co. 11,000-V outdoor type switchgear. (T.Y. 31127.)*

MELBOURNE.—April 20th. State Electricity Commission of Victoria. Automatic telephone equipment. (T.Y. 31126.)*

Aylesbury.—February 24th. Electricity Department. Electrical materials for twelve months. (February 5th.)

Barry.—February 13th. U.D.C. Stores, including electric lamps, bells, conduit fittings, &c., for one year. E. R. Hinchsliff, surveyor to the Council, Council Offices.

Bath.—March 1st. City Council. Transformers and h.v. switchgear. (See this issue.)

Beckenham.—February 22nd. Borough Council. Cut-outs, cookers, cable and meters for one year. (February 5th.)

Bedford.—February 22nd. Electricity Department. Cables, joint boxes and electric lamps for one year. (February 5th.)

Birkenhead.—February 15th. Town Council. Transformers for one year. Borough electrical engineer, Craven Street.

Birmingham.—Manufacturers wishing to have their names included in the schedules of firms from whom the Corporation invites tenders for the supply of X-ray films and equipment are invited to apply to F. H. C. Wiltshire, town clerk, Room No. 30B, Council House.

Blackburn.—March 1st. Electricity Committee. Twelve months' supply of cables, wire and meters. (February 5th.)

Bristol.—March 1st. Corporation. Switchgear. (February 5th.)

Buckhaven and Methil (FIFE).—February 17th. Town Council. Electric lighting in seventy-four houses at Methil. P. Sinclair, architect and surveyor, Methil (deposit £1 1s.).

Cardiff.—February 18th. R.D.C. Electricity Department. Transformers. (February 5th.)

Cheadle and Gatley.—February 16th. U.D.C. Electricity Department. Twelve months' supply of electrical stores. (January 29th.)

Clitheroe.—February 13th. Electricity Department. One year's supply of electrical materials. (January 29th.)

Darlington.—North-Eastern County Boroughs Joint Board for the Mentally Defective. Engineering plant at the Prudhoe Mental Colony, consisting of steam boiler, calorifier, hot water storage cylinders, steam engine driven electric generating set and supply and interconnecting mains and headers. Applications to tender to H. Hopkins, clerk to the Board, 11, Houndgate (deposit £5), by February 20th.

Dover.—March 1st. Corporation. Twelve months' supply of meters, transformers and cables. (See this issue.)

Dunfermline.—February 22nd. Managers of Dunfermline and West Fife Hospital. Electrical work at the extensions to the Nurses' Home. C. R. Douglas & Son, Prudential Chambers, 15, East Port (deposit £2 2s.).

Eccles.—February 22nd. Electricity Supply Committee. Twelve months' supply of h.v. and l.v. p.i. cable and cable joint boxes. Borough electrical engineer, Electricity Offices, 1, King Street.

Egypt.—CAIRO.—March 6th. Ministry of Public Works. Arc welding set. (T.Y. 31130.)*

Erith.—March 1st. U.D.C. Electricity Department. Electrical materials for one year. (February 5th.)

Fife.—February 16th. County Council. Electric lighting at Guardbridge school. G. Sandilands, County master of works, Property and Works Department, County Offices, Kirkcaldy (deposit £1 1s.).

Finchley.—February 22nd. Borough Council. Electrical appliances for twelve months. (See this issue.)

Gravesend.—February 20th Corporation. Transformers and kiosks. (February 5th.)

Harrogate.—February 20th. Corporation. One year's supply of electric lamps. C. E. Rivers, borough surveyor, Municipal Offices.

Heston and Isleworth.—February 15th. Borough Council. Electrically driven tower wagon. (January 29th.)

Hove.—February 22nd. Electricity Committee. Switchboard, reactors and cables. (February 5th.)

Irish Free State.—GALWAY.—February 19th. Electric cooking and subsidiary equipment at the Nurses' Home, Central Hospital. J. P. Tierney & Co., 44, Kildare Street, Dublin, C.17 (deposit £5 5s.).

Jarrow-on-Tyne.—Town Council. Electrical installation in 150 houses. Borough engineer, Town Hall.

Kingston-upon-Thames.—March 3rd. Corporation. Substation equipment. (February 5th.)

Leeds.—February 16th. Corporation. Various stores for twelve months. (January 29th.)

Littleborough.—March 1st. U.D.C. Electricity Department. One year's supply of cables and meters. (See this issue.)

Liverpool.—February 22nd. Corporation. Trucks, air-brake and electrical equipment for 100 tramcars. (January 29th.)

London. — HACKNEY. — February 24th. Borough Council. Electrical stores for one year. (February 5th.)

BETHNAL GREEN.—February 16th. Borough Council. Meters. (February 5th.)

STEPNEY.—March 1st. Borough Council. Transformers, switchgear, distribution units and street pillars; also cables. (See this issue.)

Manchester.—February 20th. Highways Committee. Automatic traffic control signals in various streets. Highways Department, City Surveyor's Office, Town Hall (deposit £1 1s. to the City treasurer).

February 18th. Town Hall Extension Special Committee. Electric lighting fittings. F. E. Warbreck Howell, town clerk, Town Hall (deposit £1 1s.).

February 24th. Electricity Committee. L.v. control cables. (See this issue.)

Middlesex.—February 26th. County Council. Public Assistance Department. Electrical sundries for twelve months and X-ray lighting, and other requisites for six months. (See this issue.)

Neath.—March 15th. R.D.C. Electrical Engineer's Department. Twelve months' supply of materials and ironmongery and electrical overhead line, service material, &c., a.c. and d.c. meters and electric lamps. G. H. Thomson, electrical engineer, Council Offices, Orchard Street.

Newcastle-upon-Tyne.—Education Committee. Electric lighting installation at the Snow Street Council school. Director of education.

New Zealand.—WELLINGTON.—March 30th. Public Works Department. Diesel-engine generating sets and switchgear. (T. 31142.)*

March 10th. Post and Telegraph Department. Engine generator set. (T.Y. 31143.)*

April 13th. Switchgear and steelwork at the Waitako power development, Section 142. (T.Y. 31144.)*

Northern Ireland.—BELFAST.—February 22nd. Town Council. Electrically driven food-mixing and potato-peeling machines. City electrical engineer, East Bridge Street.

Portland.—February 23rd. U.D.C. One year's supply of electrical goods, also transformers and switchgear, pillars and units, cables and joint boxes. (February 5th.)

Prestwich.—February 24th. U.D.C. Electric lamps, lighting lanterns and brackets for one year. H. Kay, engineer and surveyor, Town Hall.

Rhyl.—March 1st. U.D.C. Electricity Department. Cable for twelve months. (See this issue.)

Salford.—February 24th. City Council. Electrical stores. (February 5th.)

February 18th. Transformers, switchboard and circuit-breaker cubicle equipment. (February 5th.)

Skegness.—March 6th. U.D.C. Electrically driven centrifugal and reciprocating sewage and sludge pumping machinery, including stand-by electric generating plant and appurtenant mechanical appliances for the main pumping station and new sewage disposal works. W. H. Radford & Son, Albion Chambers, King Street, Nottingham (deposit £5 5s.).

Smethwick.—February 15th. St. Chad's Hospital Sub-Committee. Wireless receiving apparatus for the hospital, capable of supplying fifteen loud speakers and sixty headphones. Secretary, St. Chad's Hospital, Hagley Road, Birmingham.

South Africa.—JOHANNESBURG.—February 23rd. Rand Water board. Transformers. (T.Y. 31123.)*

PRETORIA.—February 26th. Union Tender & Supplies Board. Telegraph and telephone line material. (T.Y. 31122.)*

Spenborough.—February 17th. U.D.C. Electric pumping plant for the Public Baths, Cleckheaton. A. Rothera, surveyor to the Council, Church Street, Cleckheaton.

Stockport.—February 15th. Transport Committee. Twelve months' supply of lighting, traction and omnibus lamps. C. W. Wroth, general manager, Transport Offices, Mersey Square.

Stoke-on-Trent.—February 23rd. City Council. Electric lamps for six months. City surveyor, Town Hall.

Stretford.—February 15th. Borough Council. Steel poles for street lighting. E. Parker, borough surveyor, Town Hall.

Torquay.—February 27th. Electricity Undertaking. Cables. (See this issue.)

Uruguay. — MONTEVIDEO. — March 2nd. State Electricity Supply and Telephones Administration. L.c. cable. (T.Y. 31100.)*

Wallasey.—February 16th. Borough Council. Transformers. (February 5th.)

West Hartlepool.—February 26th. Borough Council. Transformer plant. (See this issue.)

West Riding.—February 15th. Public Assistance Committee. Electric lighting and automatic refrigeration plant at the County Institution, Hemsworth. P. O. Platts, architect, County Hall, Wakefield.

February 22nd. County Council. Electric lighting and l.p. hot water apparatus at the Armthorpe New Senior Girls' school. Education officer, County Hall, Wakefield.

Weymouth and Melcombe Regis.—February 22nd. Electricity Department. E.h.v. switchgear and transformers. (February 5th.)

February 13th. Cable. (February 5th.)

Wolverhampton.—February 19th. Borough Council. One year's supply of electrical and engineering stores. (February 5th.)

Worcester.—February 27th. Corporation. Electrical stores for twelve months. (See this issue.)

* Further particulars from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Contracts Closed

East Ham.—Electricity Committee. Accepted. Mercury electric-discharge lamps on main roads (£3,450).—Siemens Electric Lamps & Supplies.

Irish Free State.—GALWAY.—Vocational Education Committee. Wiring and electrical equipment at the new school, Father Griffin Road.

	£		£
F. Fallon. Accepted	**867**	Electricity Supply Board ...	1,000
Roche & McConnell	895	Service. Ltd.	1,131
Bective Electrical Co.	906	T. McDonagh & Sons	1,162
J. Watson	948	Haden's Eng. Co.	1,271

Keighley.—Electricity Committee. Accepted. Supplies for twelve months: Switchgear.—J. G. Statter & Co. Cables.—B.I. Cables; Metropolitan Electric Cable & Construction Co.

Leyton.—Electricity Committee. Four banks of 500-kW each, including transformer and e.h.v. switchgear at the Waterloo Road sub-station and two banks of 500-kW each, including transformer and e.h.v. switchgear at the Main Station, Cathall Road:

	£		£
Nevelin Electric Co. Recommended	**9,828**	General Electric Co.	11,430
Hewittic Electric Co.	10,939	English Electric Co.	12,271

D.c. switchboards at the Waterloo Road sub-station and the main station:

	£		£
Bertram Thomas. Recommended	**4,043**	General Electric Co.	4,290

The above equipment is required to meet the demand of the London Passenger Transport Board for the supply of electricity in connection with its trolley-bus services.

Recommended. Two 0.5 sq. in. feeder panels for the extension at the Church Lane sub-station (£188).—New Switchgear Construction Co. One 300-kVA oil immersed, self-cooled, outdoor-type transformer, one l.v. distribution kiosk and one 100-A, 15,000-kVA outdoor circuit-breaker (£286), for the h.v. supply to the Whipps Cross bathing pond, &c.—Crompton Parkinson, Ltd.

London.—CHELSEA.—Finance Committee. Recommended. Floodlighting the Town Hall and Sloane Square (£103).—Coates & Co. (Harrogate).

Manchester.—Electricity Committee. Accepted. 30,000-kW turbo-generator with condensing plant for the Stuart St. power station extensions.—Met.-Vick. Elecl. Co. Water heaters for one year.—Simplex Electric Co.; Heatrae, Ltd.; Archibald Low Electrics; Hotpoint Electric Appliance Co. L.v. cables at the Barton power station.—Edison Swan Cables; Hackbridge Cable Co. Rectifier equipments for the Royal Infirmary.—Hewittic Electric Co.

Housing Committee. Accepted. Electrical installations at 142 flats at Woodlands Road, Cheetham, and 340 houses and flats on the Crossacres estate.—D. Foote.

Health Committee. Provision of broadcasting call system at the Withington Hospital.—G.E.C.

Transport Committee. Copper trolley wire.—R. Johnson & Nephew, Ltd. Overhead equipment for trolley-bus routes.—B.I. Cables: A. Wiseman & Co.

Newcastle-under-Lyme. — Housing Committee. Accepted. Electrical installations at fifty-two houses at Milehouse Lane (£390).—Electrical Services.

Portsmouth.—Contracts Committee. Accepted. Distribution panel (£55).—Callender's. Cable.—Edison Swan Cables (£3,396); Johnson & Phillips (£598); Telegraph Construction & Maintenance Co. (£953). Transformers.—G.E.C. (£168 each); Lindley Thompson Transformer Co. (£143 each); British Electric Transformer Co. (£69 each). Lamp column extension pieces.—G. Cash & Co. Lamp brackets.—H. & W. Davis.

Rotherham.—Electricity Committee. Recommended. 25,000-kW turbo alternator set with ancillary plant.—C. A. Parsons & Co. Steam unit and ancillary plant.—International Combustion, Ltd.

Sheffield.—Health Committee. Recommended. Electrical installations at Nurses' Home, Lodge Moor Hospital (£293).—Keep & Roebuck.

Electricity Committee. Accepted. Two 15,000-kVA transformers (£12,007).—Hackbridge Electric Construction Co. One 40,000-kVA transformer for Blackburn Meadows power station (£12,850).—Met.-Vick. Elecl. Co.

South Shields.—Town Council. Accepted. Electrical installation at the new Clinic, Stanhope Road (£447).—A. J. Wares, Ltd. Electric cable (£14,463).—Henley's.

Wallasey.—Electricity Committee. Accepted. Promenade extension lighting: Cables (£752).—B.I. Cables. Lamp standards, brackets and fittings (£2,198), and base collars, &c. (£254).—Revo Electric Co.

Walsall. — Electricity Committee. Accepted. Switchgear (£2,157).—Ferguson Pailin, Ltd.

Wolverhampton.—Electricity Committee. Accepted. Switch units and metering equipment (£2,272).—A. Reyrolle & Co. Switchboard (£266).—Crompton Parkinson, Ltd. Transformer (£163).—Electric Construction Co. Circuit-breaker (£929).—G.E.C. Switch units (£234).—Ferguson, Pailin, Ltd.

Worthing.—Highways Committee. Accepted. Supplies for twelve months: Time switches.—Venner Time Switches, Ltd.; Bowden Bros. Lighting columns.—J. Every; Stanton Ironworks, Ltd. Brackets, lanterns and reflectors.—Brighton Lighting & Electrical Engineering Co.

Forthcoming Events

Institution of Electrical Engineers.—Monday, February 15th. Institution, London, W.C.2. 7 p.m. Informal meeting. Discussion on "The Value of the Development of the Lighting Load." To be opened by Mr. H. H. Long.

Meter and Instrument Section.—Friday, February 12th. Institution, London, W.C.2. 7 p.m. "Performance of Secondary Noise Meters in Terms of the Primary Standard." Messrs. B. A. G. Churcher and A. J. King.

Sheffield Sub-Centre.—Friday, February 12th. Royal Victoria Hotel, Sheffield. Annual supper dance. Wednesday, February 17th. Royal Victoria Hotel. 7.30 p.m. Address by Mr. H. T. Young. To be followed by a smoking concert.

North Midland Centre.—Tuesday, February 16th. Hotel Metropole, Leeds. 7 p.m. "Fire Precautions in Major Electrical Stations." Mr. F. C. Winfield.

North Western Centre.—Tuesday, February 16th. College of Technology, Manchester. 7.30 p.m. Faraday Lecture. "Electricity in the Hospital." Mr. R. S. Whipple.

Northern Ireland Sub-Centre.—Tuesday, February 16th. 9, Wellington Place, Belfast. 6.30 p.m. "Layout and Rupturing Capacity of Protective Devices in Motor Circuits." Mr. J. O. Knowles.

Tees-side Sub-Centre.—Tuesday, February 16th. Cleveland Technical Institute, Middlesbrough. 6.45 p.m. "Lightning." Mr. B. L. Goodlet.

Irish Centre.—Thursday, February 18th. Trinity College, Dublin. 6 p.m. Paper by Mr. J. O. Knowles.

Association of Mining Electrical Engineers *(South Wales Branch).*—Saturday, February 13th. Queen's Hotel, Cardiff. 7 p.m. Annual dinner.

Finsbury Technical College Old Students' Association.—Saturday, February 13th. Trocadero Restaurant, London, W.1. Annual dinner.

British Industries Fair.—Monday, February 15th, to Friday, February 26th. London and Birmingham.

Association of Supervising Electrical Engineers.—Tuesday, February 16th. E.L.M.A. Lighting Service Bureau, London, W.C.2. 7.15 p.m. "Electric Refrigeration." Mr. A. Bodenham

Institution of Civil Engineers.—Tuesday, February 16th. Institution, London, S.W.1. 6 p.m. "Modern Developments in Broadcasting Radio Transmission and Television." Sir Noel Ashbridge.

Royal Institution.—Thursday, February 18th. Institution, London, W.1. 5.15 p.m. "Power Supply of the Future." Prof. W. Cramp.

Birmingham Electric Club.—Friday, February 19th. Grand Hotel, Birmingham. 7 p.m. "Some High Tension Problems." Mr. J. F. Driver.

British Electrical and Allied Industries Research Association.—Friday, February 19th. Savoy Hotel, London, W.C.2. 12.45 for 1 p.m. Luncheon on the occasion of the annual general meeting.

Electrical Power Engineers' Association *(Midland Division—Birmingham Section).*—Friday, February 19th. Edgbaston Assembly Rooms, Birmingham. 7.15 for 7.45 p.m. Annual dinner dance.

Institute of Transport.—Friday, February 19th. Connaught Rooms, London, W.C.2. Annual dinner.

Tracing Leaks in Oil-filled Cables

At a recent meeting of the Société Francaise des Electriciens, M. Laroche read a paper on the tracing and localisation of leaks in pressure oil-filled electric cables. According to *L'Electricien*, in the course of the discussion M. Capdeville expressed the opinion that the tracing of slight leakages is rendered difficult owing to the degree of leakage being effected by variations in the temperature. M. Capdeville recommends that leakage tracing should be based on the measurement of the differences of pressure similar to the electrical methods of leakage localisation. The process employed consists of mounting three pressure gauges on the three phases, the indications being classified into two major groups according to whether the localisation of the leakage occurs during simultaneous or successive indications. The method, he claims, enables the disturbing effects to be eliminated up to a certain point and thus allows the leakage point to be fairly accurately determined.

Appointments Vacant

Electrical engineer for Tonbridge U.D.C.

Electrical testing assistant at the Royal Air Force Establishment, Dhibban, Iraq.

Meter repairer and tester for Ilkley U.D.C.

Junior charge engineer for Portsmouth electricity undertaking.

Meter repairer (mechanician) for Southampton Electricity Department.

Assistant technical engineer and trainees in the operation and maintenance section for Sheffield Electricity Department.

Switchboard attendant for Burnley Electricity Department.

Junior sales representative for Grays electricity undertaking.

Meter repairer and junior mains assistant for Whitehaven Electricity Department.

Boilerhouse shift engineer, junior technical assistant and junior assistant on sub-station operation for Edinburgh Electricity Department.

Electrical fitter for Hove Electricity Department.

Assistant consumers' engineer for the West Gloucestershire Power Co.

(See our classified advertisements.)

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

Mr. H. G. F. Gamble, who has been area sales engineer for the North Metropolitan Electric Power Supply Co. for several years for the districts of Southgate, Wood Green, and Friern Barnet, has been appointed sales engineer for the company's western area. Mr. Gamble joined the Northmet Co. in 1920 as district sales engineer. He has taken an active interest in local affairs, having been president of the Southgate Chamber of Commerce and also of the Rotary Club.

Mr. H. G. F. Gamble

Mr. F. H. Roper, for many years Birmingham manager for Veritys, Ltd., has relinquished that post to take up the position of sales manager with Messrs. Mayall & Co., Ltd., Birmingham.

Mr. E. H. W. Banner, M.Sc., M.I.E.E., F.Inst.P., has been appointed electrical engineer to the Armaments Inspection Department at the Royal Arsenal, Woolwich. He was formerly with Messrs. Ferranti, Ltd., on indicating instrument design, and later with Salford Electrical Instruments, Ltd. (G.E.C., Ltd.), in a similar design capacity and upon technical publicity.

Mr. W. F. Bishop, director and general manager of W. T. Henley's Telegraph Works, Co., Ltd., was elected chairman of the Cable Makers' Association at a recent meeting.

Mr. D. Johnstone Bell has been appointed water-heater specialist to Berry's Electric, Ltd., to look after the lower eastern half of England. This addition to the company's specialist staff has become necessary owing to the increase in the company's Water Heater Department.

Mr. D. Johnstone Bell

The General Electric Co., Ltd., asks us to announce that an error crept into its note sent to us with regard to the appointment of **Mr. N. A. Enticknap.** Mr. Enticknap has been appointed an assistant secretary of the company and not chief accountant, the latter position being held by **Mr. S. F. Thomas** as in the past.

Mr. L. K. Everitt, manager of the steel department of Edgar Allen & Co., has been appointed a director.

Following the expansion of the Tyne Electrical Engineers, R.E., with a Battalion of Royal Engineers (37th Tyne Anti-Aircraft Battalion, R.E.), which is responsible as a territorial unit for the anti-aircraft defence of Tyneside and the North-East, the *London Gazette* announces the following promotions to the rank of major: **Brevet-Major B. H. Leeson, T.D.,** M.I.E.E., **Capt. E. J. Parnall,** A.M.I.E.E., and **Lt. H. H. Mullens,** A.M.I.E.E. Major Leeson has been associated with the Territorial Army since its formation in 1908, when he joined the London Electrical Engineers, R.E. (T.). After war service in Gallipoli and France he was transferred to the Tyne Electrical Engineers, R.E., at Gosport in 1917, and later was appointed to the Tyne Defences. He was awarded the Territorial Efficiency Decoration in 1935. He is now second-in-command of the 37th (Tyne Electrical Engineers) Searchlight Battalion, R.E. Major Leeson is with A. Reyrolle & Co., Ltd. Major E. J. Parnall joined the Tyne Electrical Engineers in 1916, and was commissioned in 1917. He served with the British Expeditionary Force in France in command of No. 55 Anti-Aircraft Searchlight Section. He joined the staff of the North-Eastern Electric Supply Co., Ltd., fourteen years ago, and is an administrative engineer, engaged on electrical development in the Lighting and Heating Department of the company. Latterly he has been in command of No. 307 (Tyne) Anti-Aircraft Searchlight Company. Major Mullens served in the Royal Naval Air Service during the war, and subsequently was in the Royal Air Force until May, 1919. He was commissioned in the Tyne Electrical Engineers, R.E., in 1926, and has since served both in the Anti-Aircraft and Coast Defence Companies of the unit. He is now in command of No. 349 Anti-Aircraft Company. Major Mullens is on the staff of the North-Eastern Electric Supply Co., Ltd., and is chief assistant to the engineer of the Power Department, Southern Area.

The wedding took place on February 2nd of **Mr. W. Graeme Hendrey,** M.I.E.E., and Miss Eiluned Lewis, of Newtown,

Mr. and Mrs. Hendrey leaving St. Columba's, Pont Street, S.W., after their marriage

Montgomeryshire, at St. Columba's, Pont Street, S.W. The reception was held at Crosby Hall, Cheyne Walk, Chelsea. Mr. Hendrey is overseas manager and advisory director of Callender's Cable & Construction Co., Ltd., a director of the Wad Medani Electric Supply Co., an alternate director of the Sudan Light and Power Co., and secretary of the India Association, Ltd.

Mr. G. E. Dakin, who has represented the British National Electrics, Ltd., in the South and South-West Area for a number of years, has resigned from that company and has joined the staff of the Jackson Electric Stove Co., Ltd.

Mr. L. G. Price, chief showroom assistant with the St. Helens Corporation Electric Supply Department, has been appointed to the position of showroom manager and development assistant with the same undertaking.

[*Elliott & Fry*

Major H. H. Mullens | Major E. J. Parnall | Major B. H. Leeson

Obituary

Mr. H. Franck.—The death occurred recently of Mr. Henri Franck, a director of the Palestine Electric Corporation. He was sixty years of age.

Mr. F. H. Jackson.—We regret to record the death of Mr. F. H. Jackson, which occurred on February 4th. Mr. Jackson, who was assistant engineer to the City of London Electric Lighting Co., Ltd., at Bankside, joined the company just over forty-six years ago, in January, 1891, and retired in December, 1930.

Wills.—Lt.-Col. W. W. Wiggin, formerly chairman of Henry Wiggin & Co., and of William Hunt & Sons, and a director of W. & T. Avery, Ltd., left £180,568, with net personalty £151,031.

Mr. A. C. P. Soutter, managing director of the Tudor Accumulator Co., left £36,095 (net personalty £36,042).

Improved Lighting at Bournemouth

MOST of the outside lighting having been provided by gas for many years, the Bournemouth Borough Council, towards the middle of 1935, directed its energies towards an investigation of improved methods of street illumination, and, thanks largely to the efforts of the Bournemouth and Poole Electricity Supply Co., certain manufacturers of electric-discharge lamps were invited to install trial demonstrations in competition with demonstrations of a similar nature employing both high- and low-pressure gas lighting. These demonstrations coincided with the 1935 Conference of the Incorporated Municipal Electrical Association.

The new lighting in Poole Road and Wimborne Road, Bournemouth

Of the lighting schemes that were eventually submitted to the Council, that of the Bournemouth Electricity Co., employing equipment by Siemens Electric Lamps and Supplies, Ltd., was accepted, the contract comprising the installation of over 400 "Sieray" electric-discharge lamps. To achieve the desired colour effect the system consists essentially of a lantern housing a "Sieray" lamp and two gas-filled tungsten filament lamps, so arranged that the filament lighting blends with the emission from the discharge lamp.

The lighting units employed embrace both 400-W. and 250-W lamps, according to the conditions, and in the major part of the installation, which calls for directionally controlled lighting, "Gower-Sieray" lanterns are used. In those positions where symmetrical light distribution is necessary the lanterns used are the "Preston-Sieray" type.

With a few exceptions the units are mounted on ordinary traction standards, the necessary mounting height having been obtained by the lift of the bracket arms. In order to secure uniformity of light source position, in relation to the kerb line, it was necessary to measure the required bracket projection at each individual point and to provide a bracket suitable for each siting position

The operation is controlled by individual time switches, and is so arranged that the lighting intensity is graded throughout the night by employing all or any of the lamps, as desired. The installation was carried out by the Bournemouth and Poole Electricity Supply Co., which used a tower wagon with the addition of tubular scaffolding to perform the duties of a hoist, as well as its normal function.

The accompanying illustrations give an impression of the excellent lighting that has been achieved.

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

E. W. Walker & Sons, Ltd.—Private company. Registered February 1st. Capital, £100. Objects: To carry on the business of dealers in and manufacturers of electrical goods and accessories, &c. The directors are: E. W. Walker and Mrs. Ethel L. Walker, both of 19, Orchard Road, Erdington, Birmingham. Registered office: 1, Fleet Street, Birmingham.

J. Quain, Ltd.—Private company. Registered February 2nd. Capital, £1,500. Objects: To acquire the business of electrical engineers and contractors carried on by J. and A. Quain as "J. Quain," at 52, Wharf Street, Sowerby Bridge. The subscribers are: A. Quain, 52, Wharf Street, Sowerby Bridge, and J. Quain, 42, Industrial Road, Sowerby Bridge. A. Quain is to be permanent managing director. Solicitors: W. H. Boocock & Son, Sowerby Bridge.

B.I.F. Engineering Co., Ltd.—Private company. Registered February 2nd. Capital, £1,000. Objects: To carry on the business of consulting, general, electrical and mechanical engineers, contractors, merchants, agents, manufacturers of and dealers in tools, &c. The first directors are: H. Hipkiss, 172, Grove Crescent, West Bromwich, D. F. Murray, Four Winds, Sherifoot Lane, Four Oaks, Warwickshire, and B. Hipkiss, address not stated. Solicitor: John H. Hunnell, 21, Bennetts Hill, Birmingham.

Malvern Appliances, Ltd.—Private company. Registered February 1st. Capital, £1,000. Objects: To carry on the business of dealers in and manufacturers of gas and electrical appliances, machinery and apparatus, gas, electrical and general engineers, &c. The first directors are: A. A. Moore and Mrs. E. K. Moore, both of South Haddon, Christchurch Road, Malvern. Registered office: Lyttelton House, Malvern, Worcs.

Central Radio, Ltd.—Private company. Registered February 1st in Dublin. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in wireless telegraphy, telephone and photographic apparatus, &c. The subscribers are: Mrs. F. Sevitt and A. Sevitt, both of 6, Grosvenor Terrace, Rathmines, Dublin. Secretary: Mrs. F. Sevitt.

T. G. Fletcher & Co., Ltd.—Private company. Registered February 4th. Capital, £2,000. Objects: To carry on business as electrical engineers and general electrical installation contractors, &c. The directors are: R. A. Grocock (permanent managing director), 26, Mayfield Road, Leicester; T. G. Fletcher, "Chalfonts," 2nd Avenue, Wellingborough, Northants; and S. W. Chawner, Allen House, Newarke Street, Leicester.

Returns of Electrical Companies

Harold F. Ward, Ltd.—The nominal capital has been increased by the addition of £3,000 beyond the registered capital of £2,000. The additional capital is divided into 250 preferred, 1,250 ordinary and 1,500 redeemable preference shares of £1 each.

H. Ferguson & Co., Ltd.—The nominal capital has been increased by the addition of £1,500 in £1 shares beyond the registered capital of £500.

Mullard Wireless Service Co., Ltd.—Capital, £10,100 in 10,000 "A" and 100 "B" shares of £1. Return dated September 30th, 1936. All shares taken up. £9,300 paid on 9,200 "A" and 100 "B" shares, £800 considered as paid on 800 "A" shares. Mortgages and charges nil.

London Relay Wireless, Ltd.—Capital, £2,500 in £1 shares. Return dated October 21st, 1936. All shares taken up. £2,500 paid. Mortgages and charges nil.

Charlton Higgs (Radio), Ltd.—Capital, £500 in £1 shares. Return dated August 10th (filed December 10th), 1936. All shares taken up. £500 paid. Mortgages and charges nil.

Perkins Radio Service, Ltd.—Capital, £2,100 in 2,000 "A" shares of 1s. and 2,000 "B" shares of £1. Return dated November 26th, 1936. 1,250 "B" shares taken up. £1,250 paid. Mortgages and charges £750.

Associated Construction & Power Co., Ltd.—Capital, £10,000 in £1 shares. Return dated January 14th, 1937. 402 shares taken up. £402 paid. Mortgages and charges nil.

Oxford Radio Supplies, Ltd.—Capital, £1,500 in 1,500 ordinary shares of £1. Return dated November 2nd, 1936. 1,400 shares taken up. £1,400 paid. Mortgages and charges nil.

Photographic Electrical Co., Ltd.—Capital, £100 in £1 shares. Return dated November 20th, 1936. 22 shares taken up. £22 paid. Mortgages and charges nil.

Venus Radio & Electrical Co., Ltd.—Capital, £1,000 in £1 shares. Return dated August 7th, 1936. All shares taken up. £1,000 paid. Mortgages and charges nil.

Warren Brothers (Middlesbrough), Ltd.—Capital, £20,000 in 16,000 ordinary and 4,000 deferred shares of £1. Return dated September 29th, 1936. 8,030 ordinary and 4,000 deferred shares taken up. £7,904 paid on 7,904 ordinary shares, £4,126 considered as paid on 126 ordinary and 4,000 deferred shares. Mortgages and charges £1,000.

R. Marshall, Ltd.—Particulars filed of debentures not exceeding £2,000 authorised December 21st. 1936, charged on the company's undertaking and property, including uncalled capital, the amount of the present issue being £1,500.

Western Electricity Supply Co., Ltd.—Capital, £350,000 in 100,000 6 per cent. cumulative preference and 250,000 ordinary shares of £1. Return dated December 1st, 1936. All shares taken up. £350,000 paid. Mortgages and charges nil.

Trulite, Ltd.—Capital, £500 in £1 shares. Return dated December 2nd, 1936. 402 shares taken up. £402 paid. Mortgages and charges nil.

Radioptics, Ltd.—Capital, £1,000 in £1 shares. Return dated November 25th, 1936. 702 shares taken up. £2 paid, £700 considered as paid. Mortgages and charges nil.

E. C. Stokes, Ltd.—Capital, £1,000 in £1 shares. Return dated October 26th, 1936. 502 shares taken up. £2 paid, £500 considered as paid. Mortgages and charges nil.

Halliwell & Co., Ltd.—The nominal capital has been increased by the addition of £8.000 in £1 ordinary shares beyond the registered capital of £3,000.

E. N. Bray, Ltd.—The nominal capital has been increased by the addition of £4,000 beyond the registered capital of £10,000. The additional capital is divided into 2,000 7 per cent. "A" cumulative preference shares of 10s. and 3,000 ordinary shares of £1.

Everything Electrical, Ltd.—Mortgage on debts amounting to £709 14s. 1d. due to the company, dated January 26th, 1937, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Modern Productions, Ltd.—Debenture dated January 27th, 1937, to secure £180 charged on the company's undertaking and property, present and future, including uncalled capital (subject to deeds of indemnity dated January 23rd, 1936, and August 11th, 1936). Holder: M. S. Bain, 187, Highfield Road, Washwood Heath, Birmingham.

G. S. Hawker, Ltd.—E. G. Bourne, Terminus Chambers, 6, Holborn Viaduct, E.C., was appointed receiver and manager on January 27th, 1937, under powers contained in debenture dated November 26th, 1931.

City Notes

The Westinghouse Brake Signal Co., Ltd.—At the annual meeting held on February 9th Lord Southborough (chairman), who presided, reported improvements in the fortunes of their subsidiary companies. During the year under review, he said, additions had been made to the buildings and plant at the Chippenham works. Home railways were pursuing a policy of improvement and provision of increased facilities and, in consequence, the company had had large orders for signalling apparatus and railway brakes and heating apparatus. They had benefited by the development of trolley-buses, which were mainly fitted with their brakes, while there was a rise in orders received for Westinghouse metal rectifiers. The introduction of their rectifiers into the electro-plating field had been successful, and the use of this equipment for telephony and telegraphy had increased. The large amount of change-over work from d.c. to a.c. had also added to the volume of this line of business. Present conditions in Australia, New Zealand, India and China had resulted in more orders being placed with the parent company or the subsidiaries. With regard to the future, the months from September last to date gave every indication of a good financial year. Capt. B. H. Peter (managing director), said that they had large orders for the usual form of brake, but the past year had seen an important development in their electro-pneumatic brake system, which was particularly suitable for high-speed and high-frequency traffic. On the signal side they had received important orders from home railways, while further orders for signalling work had come from New Zealand, China and other countries.

The Yorkshire Electric Power Co. reports a net profit for the year ended December 31st last of £535,628, as compared with £483.033 in the preceding year, to which is added £70,094 brought in, making £605.722. The dividend for the year on the ordinary stock is maintained at 8 per cent., depreciation and reserve fund receive £220.000, plant renewals fund £65,000, and £10.000 is contributed to the establishment of a staff superannuation fund. The balance carried forward is £83.970. The report states that a continued improvement of trade in the company's area coupled with a considerable amount of new business has resulted in an increase of revenue greater than in any previous year. The sales of electricity to consumers during the year totalled 366.157.774 kWh, as against 305.860.113 kWh in 1935, and the total supplied to the Central Electricity Board was 90.249 889 kWh (against 134.021.493 kWh). Substantial extensions of sub-stations and mains have been made throughout the company's area. The extension of the Thornhill power station has been rapidly proceeded with and part of the new plant was available for use in November, 1936. To provide for further demands for electricity an extension of the Ferrybridge power station is required and contracts have been placed for plant and machinery, which will increase the capacity of that station to more than three times the present figure. The supply authorised by the North Lincolnshire and Howdenshire Electricity Special Order, 1932, and the Barton-upon-Humber Electricity Special Order, 1935, has been actively extended. The assets of the Barton-upon-Humber Electric Supply Co., Ltd., have been transferred to the North Lincolnshire and Howdenshire Electricity Co., Ltd., and the Barton Co. has been wound up, thus unifying the company's operations in Lincolnshire. Mr. W. B. Woodhouse, engineer and manager of the company, was elected to the Board in June last. Meeting: February 15th, at Leeds.

The Lancashire Electric Light & Power Co., Ltd., reports that the trading profit of the subsidiary companies for the year 1936, plus interest receivable, amounts to £426,056, to which is added £9,115 brought forward, making £435,171. After meeting income tax, depreciation, &c., and adding management fees and sundry receipts, there is a balance of £301,697. After meeting directors' fees, establishment charges, debenture interest, &c., and paying dividends of 7½ per cent. on the ordinary shares and 7½ per cent. on the participating preference shares, there is carried forward £5,641. During the year considerable extensions were made to the systems of the operating companies and showrooms were opened in Whitefield and Ramsbottom. The charges made to domestic and other small consumers were reduced in the middle of the year. The new 50,000-kW turbo-alternator at Kearsley was put into service at the end of the year. The results of the Lancashire Electric Power Co.'s business were as follows:—

	1935.	1936.
Units sold, excluding C.E.B.	329,917,945	369,739,212
Units exported to C.E.B.	166,716,500	183,886,000
Maximum load in kW excluding C.E.B. ...	119,127	128,067
kW connected	150,620	162,762
Receipts, excluding Central Electricity Board	£850,095	£946,559
Received from Central Electricity Board ...	£70,117	£103,611
Expenditure	£537,320	£627,105
Profit on trading	£382,892	£423,065

Companies Struck off the Register.—The names of the following companies have been struck off the Register and they are thereby dissolved:—Commercial Radio Co., Ltd.; Electro Thermic Development Co., Ltd.; Euradic Electric Co., Ltd.; Precision Radio & Manufacturing Co., Ltd.; Red Star Radio. Ltd.; Superservices (Radio), Ltd.

The London Passenger Transport Board has announced a payment on account of interest on its "C" stock of 1½ per cent., less tax, for the year ending June 30th next. A similar distribution of 1½ per cent. was made on the "C" stock a year ago, which was followed by a final payment of 2½ per cent., making 4 per cent.

Waygood-Otis, Ltd., report a net profit for 1936 of £161,977, as compared with £155.419 in the preceding year. Reserve for contingencies receives £30,000, and reserve for pensions £10,000. The final ordinary dividend is 12½ per cent., maintaining the dividend for the year at 25 per cent., and a special bonus of 15 per cent. is paid (against 10 per cent.), leaving £26,518 to be carried forward. Meeting: February 17th.

The Consolidated Signal Co. proposes to pay a dividend of 30 per cent. on the ordinary stock for the year ended September 30th last. For 1934-5 13½ per cent. was paid on the preference shares (thus clearing off arrears), and 7 per cent. was distributed on the ordinary capital.

The City of Buenos Ayres Tramways (1904), Ltd., reports a net revenue for 1936 of £71,681, as compared with £70,519 in the preceding year, to which is added £1,538 brought in. The final dividend is 1¼ per cent., less tax, making 5 per cent. (same), and £1,135 is carried forward.

Edmundson's Electricity Corporation, Ltd., reports that the results of the operations of its group of companies during January, as compared with the corresponding month of 1936, show an increase of 13 per cent. in kWh sold.

The Northampton Electric Light & Power Co., Ltd., proposes to pay a final dividend of 6 per cent. on the ordinary shares (making 10 per cent. for the year).

The Rushden & District Electric Supply Co., Ltd., recommends a final dividend of 4½ per cent., making 8 per cent. for the year ended December 31st.

Petters, Ltd., announce the payment of the interim dividend on the 7½ per cent. cumulative preference shares.

The Direct Spanish Telegraph Co. is maintaining the ordinary dividend at 6 per cent.

Stocks and Shares

TUESDAY EVENING.

FROM the point of view of price fluctuations the week's most interesting feature in the electrical markets has been brought about by the development in connection with the Electrical and Musical Industries and the Baird Television companies. The decision that the Marconi-E.M.I. system shall be selected for television transmission led to rises in the price of the former shares and falls in the Baird group. Some of the buying of "Emmie" shares is attributed to American sources.

American influence has been noticed also in other markets of the London Stock Exchange. A general fall in Wall Street followed President Roosevelt's latest declamation, but the drop in prices brought in a fresh supply of buyers and utility shares are amongst those that have made headway during the past few business days. Amongst our own gilt-edged securities a temporarily firm tone developed, upon banks and other big purchasers coming in to support the War Loan and British Government securities. The selling proved better than

the buying, as the Stock Exchange saying has it, and the War Loan led a general fall in the investment markets.

A fair amount of speculative activity prevails in the stocks of Cable and Wireless. New issues continue to attract a good deal of attention. In the majority of cases the stock and shares offered for subscription are readily taken.

Television Shares Flurry

Market reaction to news of the selection of the Marconi-E.M.I. system for present television transmissions took the shape of spectacular price movements in shares of the companies concerned. Baird issues were knocked down to half their previous values, E.M.I. shares jumped to over 27s. "Emmies" had already risen, earlier in the week, from 23s. 9d. to 25s. 6d., on an inkling that some such development was in the air. After touching 27s. 3d., the price reacted to 26s. Baird deferred and preferred, after falling to 2s. and 1s. respectively, were helped to partial recovery by the company's official statement. The present, Tuesday's, prices are 3s. and 1s. 9d. Sober opinion, making itself heard after the first clamour aroused by the statement, called to mind that, as it is apparently to the sale of receiving not transmitting apparatus that both companies look to earn the bulk of their present profits in the television field, the significance of the new development had been misconstrued. A genuine bull-point in the situation, as far as "Emmies" are concerned, seems to be that the prestige bestowed by selection of the company's system will fortify the company against competition in the sales field. Apart from the television factor, other branches of the company's widening interests are thought to be doing well.

Electricity Supply Preference Shares

Depression in gilt-edged stocks has spread its influence throughout the field of fixed-interest securities. Attention was called here, last week, to several lines of electrical equipment companies' preference shares which are currently offered at prices a shilling or two lower than those asked a few weeks back. Preference shares of electricity supply companies are offered more freely than those in the equipment list, but prices have not fallen off to the same extent. Many shares are, nevertheless, obtainable in fair numbers at anything up to 1s. cheaper than recently was the case, to yield, as a rule, between 3¾ and 4 per cent. The 6 per cent. preference shares of British Power and Light, City of London, "Three Counties," Midland Counties, Scottish Power, and various others can be bought at prices which allow a return within the limits mentioned. Yields of upwards of 4 per cent. can be had in a few instances. One example is Cornwall Power 7 per cent. non-cumulative preference, which are on offer at 29s. 6d., paying £4 14s. 9d. per cent. on the money.

Rheostatic

Business in Rheostatic shares, introduced last week to the Stock Exchange, opened at around 9s. 3d. for the 4s. ordinary and 10s. 3d. for the 6 per cent. 10s. preference. The prices hardened, later, to 10s. 9d. and 10s. 6d. respectively. The yield on the preference, at this price, works out at £5 14s. per cent. Recently earned profits of the company, as set out in the preliminary Press statement, are a rough guide to likely future returns on the ordinary. During the six months ended in September last profits were equivalent to 18 per cent. on the issued ordinary capital, after allowing for payment of the preference dividend, which was itself covered five times over. For the two years and nine months ending on the same date the proportion of profits to capital averaged 14¾ per cent., with the preference dividend covered 4.3 times.

Cable and Wireless Stocks

The past week has seen further appreciation in Cable and Wireless stocks, which have been rising steadily in price since the beginning of a healthy improvement, noticeable towards the closing months of last year, in the monthly traffic indices. The preference stock stands now at 111, the highest point reached since the annual meeting last May. The arrears of dividend included in the price continue to attract speculative inquiry. The possibility of early measures being taken for their elimination is largely responsible for bullish interest in the ordinary stocks: these claim the attention of the hardier type of speculator, who hopes to see his holdings in a position to share surplus profits at a date nearer than seems possible under present conditions. Globe Telegraph ordinary responded, with a 20s. rise, to the brighter outlook for Cable and Wireless. Marconi Marines, which recently crossed the £2 mark for the first time in many months, reacted to 38s. 9d. Gt. Northern Telegraphs are again 5s. down, at 45½.

Miscellaneous Matters

A jump from 91s. to 94s. in the price of General Electrics is one of the few features of an otherwise generally inactive market for electrical equipment shares. The market is disposed to couple G.E.C. with British Insulated as the most likely bonus distributors in the not-far-distant future. Lancashire Dynamo are 5s. higher at 72s. 6d.

The interim payment of 1½ per cent. on London Transport "C" stock coincided with expectation; the price of the stock remains at 97. Brazilian Tractions rose further to 24½ on a continuance of strong buying from both sides of the Atlantic. Iron and steel shares showed a reactionary disposition as some of the more recent buyers came in to take their profits. The only point of interest in the rubber share market is the steadiness of absorption to which daily dealings bear witness.

Share List of Electrical Companies

	Nom.	Dividend. Previous.	Dividend. Last.	Price. Feb. 9.	Rise or Fall.	Yield. p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	77/6	—	3 17 5
City of London	1	7⅛	7⅛	38/-	—	3 19 0
Clyde Valley	1	7	8	45/6	—	3 9 7
County of London	1	10⅛	10⅛	54/-	—	3 17 0
Edmundson's 7% Pref.	1	7	7	35/-	—	4 0 0
Do. Ord.	1	8	8	44/6	—	3 12 0
Elec. Dis. Yorkshire	1	9	9	45/6	—	3 19 0
Elec. Fin. and Securities	1	12½	12½	3⅛	—	4 1 7
Elec. Supply Corporation	1	11	11	58/3	—	3 15 7
Lancs Light and Power	1	7½	7½	38/-	—	3 19 0
Lond. Assoc. Electric	1	—	7	35/-	—	4 0 0
London Electric	1	7	8	40/-	—	4 0 0
London Power Deb. Red.	Stock	5	5	106½	—	4 14 0
Metropolitan	1	10	10	50/6	—	3 19 2
Midland Counties	1	7	7½	40/6	—	3 14 6
Mid. Elec. Power	1	8	8	42/6	—	3 15 3
North Eastern Electric Ordinary	1	6	6	33/6	—	3 11 10
Do. 7% Pref.	1	7	7	35/-	—	4 0 0
Northampton	1	10	10	51/3	—	3 18 2
Notting Hill 6% Pref.	10	6	6	14	—	4 5 9
North Met. Elec. Ordinary	1	10	10	54/-	—	3 14 0
Do. do. 6% Pref.	1	6	6	31/6	—	3 16 2
Scottish Power	1	8	8	42/-	—	3 16 2
South London	1	7	7	34/6	—	4 1 2
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	23/-	—	6 10 4
Yorkshire Elec.	1	8	8	44/6	—	3 11 10
PUBLIC BOARDS.						
Central Electricity, 1950–70	Stock	5	5	115	−1	4 6 7
Do. 1955–75	„	5	5	120	—	4 3 4
Do. 1951–73	„	4½	4½	112	—	3 19 8
Do. 1963–93	„	—	3½	102	—	3 8 8
London Elec. Trans. Gtd.	„	—	2½	91	—	2 14 9
London & Home Counties, 1955–75	„	4½	4½	114	—	3 19 0
London Passenger Transport, A	„	—	4½	119½	−1	3 15 4
Do. do. B	„	—	5	121½	−1	4 2 4
Do. do C	„	3½	4	97	—	4 2 6
West Midlands Joint Elec. 1948–68	„	—	5	116½	—	4 5 10
TELEGRAPH AND TELEPHONE.						
American Tel. & Tel.	$100	9	9	187½	—	4 16 0
Anglo-Am. Tel. Pref.	Stock	6	6	127½	—	4 14 1
Do. Def.	„	1½	1½	31½	—	4 15 4
Cable & Wireless 5½% Pref.	„	4½	5½	111	+3½	4 19 1
Do. A. 7½% Ord.	„	Nil	Nil	25	+¾	—
Do. B. Ord.	„	Nil	Nil	8½	+1	—
Globe Tel. & Tel. Ord.	10	3½*	4½*	15½	+1	3 0 0
Do. Do. Pref.	10	6	6	14½	—	4 2 9
Great Northern Tel.	10	20	20	45½	−½	4 8 0
Marconi-Marine	1	10	7½	1 13/16	—	3 17 5
Oriental Telephone Ord.	1	12*	12*	3⅛	—	3 12 6
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	Nil	Nil	5/9	—	—
Do. do. 2nd Pref.	5	Nil	Nil	3/9	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	24½	—	—
British Electric Traction Df. Ord.	„	5	5	1575	—	—
Do. do. Pref. Ord.	„	8	8	167½	−2	4 15 5
Brazil Traction	100	—	70 cts.	24½	+⅜	—
Brit. Columbia Elec. Rly. Pce.	Stock	5	5	105½	—	4 14 9
Mexican Light Common	100	Nil	Nil	3½	—	—
Do. 1st Bonds	$500	5	5	47	—	—
Victoria Falls Ord	1	20	12	76/3	—	3 3 2
West Riding	1	5	6½	47/6	—	2 14 8
MANUFACTURING COMPANIES.						
Aron Electricity Ord.	1	10	15	2⅜	—	5 4 4
Assoc. Elec. Ord.	1	6	8	54/-	+1/6	2 19 4
Do. Pref.	1	8	8	39/-	—	4 2 0
Babcock & Wilcox	1	8	8	51/3	—	3 2 5
British Aluminium Ord.	1	7½	7½	45/-	+6d.	3 6 8
British Insulated Ord.	1	15	20	6⅝	—	2 19 9
Brush Ord.	Stock	Nil	Nil	38½	+1	—
Callender's	1	15	15	4⅞	—	3 1 6
Do. 6½% Pref.	1	6½	6½	32/6	—	4 0 0
Crompton Parkinson Ord.	5/-	12½	12½	77/6	+½	—
Do. 8% Pref.	1	8	8	37/6	—	4 5 4
Electric Construction	1	3½	7	42/6	—	3 5 9
Enfield Cable Ord.	1	25	25	5¾	—	4 17 0
English Electric	1	Nil	Nil	32/-	—	—
Do. Do. Pref.	1	6½	6½	26/-	—	5 0 0
Ericsson Tel.	5/-	24	20*	58/9	—	1 14 0
Ever Ready	5/-	35	35	32/6	—	5 7 8
Ferranti Pref.	1	7	7	26/3	—	5 6 8
G.E.C. Pref.	1	6½	6½	31/3	—	4 3 2
Do. Ord.	1	10	15	94/-	+3/-	3 4 0
Henleys	5/-	30	30	21/-	−6d.	3 11 5
Do. 4½% Pref.	1	4½	4½	1⅛	—	3 12 0
India-Rubber Pref.	1	1⅛	5½	23/3	—	4 17 9
Johnson & Phillips	1	7½	10	51/3	−9d.	3 18 0
Lancashire Dynamo	1	5	10	3⅛	+¼	2 15 2
Siemens Ord.	1	4	6	33/9	—	3 11 0
Telegraph Construction	£1	Nil	Nil	32/6	—	—

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1935

10986. "Regulating transformers." Naamlooze Vennootschap Machinerieen en Apparaten Fabrieken Meaf. July 24th, 1934. (459597.)

10987. "Regulating transformers." Naamlooze Vennootschap Machinerieen en Apparaten Fabrieken Meaf. November 19th, 1934. (459598.)

16431. "Method of and arrangement for producing synchronising impulses for television transmitters." Radioakt.-Ges. D. S. Loewe. June 7th, 1934. (Addition to 441761.) (459602.)

16791. "Alternating-current signalling systems." Telephone Manufacturing Co., Ltd., and L. H. Paddle. June 11th, 1935. (459779.)

16853. "Coin-freed prepayment mechanism." British Electric Meters, Ltd., and R. T. Brown. July 11th, 1935. (459849.)

17171. "Electric foot-massage appliance." Scholl Manufacturing Co., Ltd., and G. Thornton-Norris. June 14th, 1935. (459783.)

19419. "Electromagnetically operated switches or circuit-controlling devices." C. J. Evans and S. C. Evans. July 8th, 1935. (459717.)

19497. "Electric servomotor control arrangements, particularly for variable-speed transmission for automobiles." G. Fleischel. December 15th, 1934. (459718.)

19854. "Telephone systems." Automatic Electric Co., Ltd., C. E. Beale and I. T. Richards. July 11th, 1935. (459792.)

19906. "Covers for electric cables." E. Squire. July 12th, 1935. (459851.)

20022. "Television and like systems." E. L. C. White. July 12th, 1935. (459853.)

20075. "Thermionic-valve amplifiers." T. M. C. Lance, P. W. Willans and Baird Television, Ltd. July 13th, 1935. (459723.)

20138. "Dynamo-electric plant." G. M. Pestarini. July 13th, 1934. (459858.)

20141. "Electroplating apparatus." R. Cruickshank, Ltd., and G. Major. July 15th, 1935. (459859.)

20152. "Focusing means for cathode-ray tubes and the like." C. Szegho and Baird Television, Ltd. July 15th, 1935. (459860.)

20164. "Means for interconnecting a single-phase supply system and a multi-phase supply system." British Thomson-Houston Co., Ltd. July 16th, 1934. (459919.)

20169. "Telephone instruments." Automatic Electric Co., Ltd., and S. R. Smith. July 15th, 1935. (459862.)

20180. "Vapour-electric convertors." General Electric Co., Ltd., E. Gallizia and D. H. Donaldson. July 15th, 1935. (459863.)

20281. "Electric circuit-breakers." A. Reyrolle & Co., Ltd., A. Allan and N. R. Blanch. July 16th, 1935. (459868.)

20282. "Metal-clad electric switchgear." A. Reyrolle & Co., Ltd., and A. Allan. July 16th, 1935. (459869.)

20296. "Telephone systems and automatic switches for use therein." Automatic Electric Co., Ltd., R. Taylor and G. T. Baker. July 16th, 1935. (459872.)

20380. "Jointing of coaxial conductor electric cables." Standard Telephones & Cables, Ltd., and H. Birkby. July 17th, 1935. (459883.)

20391. "Magnetic sound record carrier." Allgemeine Elektricitäts-Ges. and I. G. Farbenindustrie Akt.-Ges. July 18th, 1934. (459884.)

20454. "Electric control systems for steam boilers and the like." Clyde Oil Fuel Systems, Ltd., and E. A. Richardson. July 18th, 1935. (459801.)

20481. "Leading-in wires adapted to be sealed through vitreous envelopes." General Electric Co., Ltd. (Patent Treuhand Ges. für Electrische Gluhlampen). July 18th, 1935. (459922.)

21084. "Telephone systems." Automatic Electric Co., Ltd., C. E. Beale and I. T. Richards. July 24th, 1935. (459803.)

21738. "Cooling of high voltage electrical machines." English Electric Co., Ltd., and F. A. Youngmark. July 31st, 1935. (459729.)

22578. "Means for controlling the electrical characteristics of direct-current generators and transformers." G. M. Pestarini. August 16th, 1934. (459902.)

24737. "Electrically heated boiling vessels." Voigt & Haeffner Akt.-Ges. and R. Trambauer. September 5th, 1935. (459606.)

26700. "Overload circuit-breakers." G. E. Crabtree, W. T. Elliott, E. Badham and R. W. Thornton (legal representatives of J. A. Crabtree (deceased)). (Schiele & Bruchsaler Industriewerke Akt.-Ges.). September 27th, 1935. (459807.)

29400. "Means for transmitting television signals or the like." General Electric Co., Ltd., and D. C. Espley. October 24th, 1935. (Cognate application, 19554/36.) (459735.)

31191. "Electric plug couplings." W. Dabscheck. November 11th, 1935. (Convention date not granted.) (459609.)

32163. "Time-bases for cathode-ray tubes." General Electric Co., Ltd., and D. C. Espley. November 20th, 1935. (459610.)

34351. "Synchronous motor clocks and time-operated mechanisms." Horstmann Gear Co., Ltd., and A. Horstmann. December 11th, 1935. (459907.)

34776. "Electrical connecting caps." A. Mendel and E. Kleinmann. July 11th, 1935. (459613.)

1936

1566. "Dielectric materials and electrical apparatus using such materials." Standard Telephones & Cables, Ltd. (Western Electric Co., Inc.). January 17th, 1936. (Convention date not granted.) (459816.)

2169. "Bimetallic electrical trolley wire." Vereinigte Aluminium-Werke Akt.-Ges. and Vereinigte Deutsche Metallwerke Akt.-Ges. Zweigniederlassung Heddernheimer Kupferwerk. February 1st, 1935. (459743.)

2185. "Phase-shifting circuits." British Thomson-Houston Co., Ltd. January 25th, 1935. (459620.)

2832. "Electrical key-switching devices for electrically operated locks and the like." R. Henderson. March 20th, 1936. (459621.)

3813. "Electrical feeler control systems for profiling copying machines." Siemens-Schuckertwerke Akt.-Ges. February 7th, 1935. (459685.)

6557. "Electric remote control systems." British Thomson-Houston Co., Ltd. March 4th, 1935. (459625.)

7026. "Traffic-control systems and apparatus." Automatic Signal Corporation. March 14th, 1935. (459754.)

10700. "Electric lampholders." A. F. Bulgin & Co., Ltd., and A. F. Bulgin. April 14th, 1936. (459628.)

13911. "Electric motor control." British Thomson-Houston Co., Ltd. May 17th, 1935. (Addition to 458390.) (459640.)

14133. "Controlling and regulating the heating elements of electric kettles and like boiling or cooking apparatus." G. Wilkinson. May 19th, 1936. (459475.)

15403. "Electric welding apparatus." British Thomson-Houston Co., Ltd. June 1st, 1935. (459346.)

15895. "Piezo-electric crystal mountings." Marconi's Wireless Telegraph Co., Ltd. June 14th, 1935. (459645.)

16014. "Valve circuit arrangements for very short waves." Telefunken Ges. für Drahtlose Telegraphie. June 8th, 1935. (459348.)

16018. "Electric switching devices, particularly for use on motor vehicles." E. Van der Haegen. June 8th, 1936. (459696.)

16061. "Typeprinting telegraphy." J. Estoup. June 19th, 1935. (459646.)

16145. "Press-button switches." E. K. F. Welin. June 9th, 1936. (459647.)

17360. "Laminated brushes for dynamo-electric machines." Siemens-Planiawerke Akt.-Ges. für Kohlefabrikate. July 23rd, 1935. (459698.)

18516. "Thermal electric switches." R. O. Mapelli and G. White. July 3rd, 1936. (459271.)

18526. "Reproducing apparatus for picture - telegraph systems." C. Lorenz Akt.-Ges. July 5th, 1935. (459272.)

18867. "Regulating arrangements for the synchronous running of teleprinting machines." Siemens & Halske Akt.-Ges. July 12th, 1935. (459273.)

19887. "Electrical condensers." Standard Telephones & Cables, Ltd. August 16th, 1935. (459489.)

20106. "Transmitter devices for facsimile printing telegraph installations." Siemens & Halske Akt.-Ges. July 19th, 1935. (459275.)

21030. "Self-starting single-phase alternating-current synchronous motor." O. Janzen. February 17th, 1936. (459351.)

22330. "Photometers for measuring illumination." General Electric Co., Ltd. September 18th, 1935. (459277.)

22742. "Electric lamp bulbs for motor car head lights and the like." M. Emslander. August 18th, 1936. (459495.)

23738. "Directional magnets for arc lamps." Zeiss Ikon Akt.-Ges. August 29th, 1935. (459280.)

24661. "Current collecting equipment for electric vehicles." Westinghouse Electric & Manufacturing Co. September 13th, 1935. (459498.)

25428. "Electric couplings." Rheinmetall-Borsig Akt.-Ges. and W. S. Zur Wiesch. September 18th, 1936. (459284.)

25853. "Masks for the screens of cathode-ray tubes." General Electric Co., Ltd., and F. R. Jones. September 23rd, 1936. (459355.)

26035. "Controlling systems for electrically operated lifts." General Electric Co., Ltd., and N. C. Smart. November 7th, 1935. (Divided out of 30785/35.) (459655.)

32632. "Wiper switches such as are used in automatic telephone systems." Standard Telephones & Cables, Ltd., and J. R. Gould. June 1st, 1935. (Divided out of 459233.) (459287.)

35084. "Indicating device for liquid-filled electrical apparatus." M. Bochholz. July 26th, 1934. (Divided out of 19481/35.) (459528.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from February 3rd:—

Goblin. No. 573803. Class 6. Machinery of all kinds and parts of machinery. No. 573804. Class 8. Philosophical and scientific instruments and apparatus for useful purposes.—British Vacuum Cleaner and Engineering Co., Ltd., Parsons Green Lane, Fulham, S.W.6.

Le Carbone (lettering and design). No. 566649. Class 8. Electric accumulators and batteries (not for medical purposes).—La Société Le Carbone, Gennevilliers, France. (British representatives: D. Young & Co., 11-12, Southampton Buildings, Chancery Lane, W.C.2.)

Cul-Mag. No. 570863. Class 8. Galvanic battery apparatus for adding to the growth of plants.—Mildred G. Mann and Muriel E. F. Frant, trading in co-partnership, 8, Connaught Place, W.2.

R.G.D. No. 573042. Class 8. Radio-gramophones, wireless receiving apparatus, loud speakers, microphones and sound amplifying apparatus.—Radio-Gramophone Development Co., Ltd., Globe Works, Newtown Row, Birmingham.

Notek. No. 573798. Class 13. Metal goods.—Notek Electric Co., 175, Merton Road, S.W.19.

Silshaw. No. 572886. Class 18. Electric radiators and electric heating devices.—E. J. Shaw, E. Shaw and G. Silkstone, trading as Eastwood Industries, 485b, Fitzwilliam Road, Rotherham, Yorks.

Wellstead Electrical Insulation (lettering and design). No. 572254. Class 50. Electrical insulating materials in the form of sheets, rods, tubes and the like, composed of vulcanised fibre, mica, synthetic resin or bitumen, and electrical insulating tapes composed of textile materials impregnated with india-rubber or bitumen.—Presspahn, Ltd., 38, Well Street, Bradford, Yorks.

Duro-Protex. No. 574162. Class 50. Backings of synthetic resin for protecting light reflective surfaces.—Webb's Crystal Glass Co., Ltd., 40-43, Norfolk Street, Strand, W.C.2.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberdeen.—Infectious diseases hospital, Inverurie (£50,000); R. L. Rollo, architect, Aberdeen.

Barking.—Extensions to Manor Joinery Works, Ltd.

Barrow-in-Furness.—Houses (26), Friars Lane; G. Stephenson. Houses (122), Rating Lane; J. Whittaker (Builders), Ltd. Houses (26), and shops, Bristol Street; A. Nuttall & Partner.

Berwick (NORTHUMBERLAND).—Houses (238); borough engineer.

Birmingham.—Houses (240), near Highfield Road, Ward End; Jones & Croxford, architects, 112, Colmore Row, Birmingham.

Blackpool.—Houses (27), Marcroft Avenue; R. Mitchell. Food factory, Chiswick Grove; Knowlson, Ltd. Premises, Church Street and Coronation Street, for the Littlewoods Mail Order Stores, Ltd. Theatre, Lytham Road; South Shore Theatres, Ltd. Extensions to hotel, Dickson Road; Imperial Hydro Hotel Co., Ltd.

Blaenau Festiniog.—Houses (26); U.D.C. surveyor, Council Offices.

Bradford.—Shops, &c., Central area (£50,000); city architect.

Bristol.—Houses (50), Horfield estate (£24,540); W. J. Kew, Ltd. Buildings, Avon Street (£18,000); G. G. Lincoln, 136, Victoria Street. Stores, Broad Weir; Bristol Co-operative Society. Technical college, Leek Lane, for E.C.

Bromborough (CHESHIRE).—Headquarters, Wirral Police, with courtrooms, houses, offices, &c. (£47,550), for the Cheshire Standing Joint Committee; county architect, Newgate Street, Chester.

Cambridge.—Houses (38) and flats; borough surveyor.

Caterham.—Houses (67), Foxon Lane; W. Buston.

Chesterfield.—Houses (36), Old Whittington; borough engineer, 2, Gluman Gate. Houses, Turner's estate; W. H. Wagstaffe & Sons, architects.

Derby.—Houses (60), Bridge Gate; C. H. Aslin, borough architect, Gower Street.

Doncaster.—Houses (46), Armthorpe (£16,058); A. King & Son, builders, Edenthorpe.

Dover.—Houses (162), St. Radigund's Road and Bunker's Hill (£77,760); borough surveyor.

Dunmow (ESSEX).—Houses (74); R.D.C. surveyor.

Eccles.—Extensions to works, Gorton Street; L. Gardner & Sons, Ltd.

Elie.—Houses, Woodside Place and Woodside Road; Moncrieff Bros., Shorehead, Leven

Epsom.—Extensions to Surrey C.C. hospital; Newberry & Fowler, architects.

Gateshead-on-Tyne.—Maternity and child welfare centre, Mulgrave Terrace; borough engineer.

Glasgow.—Civic printing works, Oakbank Street (£34,000); city architect. Factory, Riverford Road, Pollokshaws; H. W. Stewart, Ltd. Extensions to works for Collars, Ltd., Anniesland; A. C. Sutherland and F. W. Kennedy, architects, 213, West Campbell Street, Blythswood.

Grantham.—Houses (90); borough surveyor. Factory for the Melton Mowbray Dairies, Ltd., Victoria Street, S.W.1.

Haslingden (LANCASHIRE).—Houses (42) and flats, Longshoot (£16,000); Ashworth & Hobson, builders, Rawtenstall.

Hinckley.—Extensions to hosiery factory for B. A. Ryley, Holliers Walk.

Hockley.—Four-storey factory, Heaton Street (£25,000), with electrical work; Maddocks & Walford, builders, Tyburn Road, Birmingham.

Ilford.—Houses (60), near New North Road; Davis Estates, Ltd., 346/350, Kilburn High Road, London, N.W.6. Extensions to store, High Road; F. W. Woolworth & Co., Ltd., 1, New Bond Street, London, W.1.

Ipswich.—Houses (256), Priory Heath estate (£91,760); Simms, Sons & Cooke, Ltd.

Irish Free State.—(ATHLONE, Co. WESTMEATH).—Houses, Bogganfin, and Curragh Mechum; Owen Doyle, engineer and town surveyor, Town Hall, Athlone. (DUBLIN).—Extensions to works for the Irish Carton Printers, Ltd., Botanic Road. (PORTUMNA, Co. GALWAY).—School, Portumna, for County Galway Vocational E.C.; G. Lee, engineer and county surveyor, Prospect Hill, Galway.

Jarrow-on-Tyne.—Houses (600), Simonside; borough engineer.

Keighley.—Houses (160), Guard House estate; borough engineer. Houses (41), Hallows Road; N. Proctor.

Kidderminster.—Houses (45), near Marlpool Lane; T. B. Edwards.

Lancaster.—Houses (30), Scotforth Road; F. Kelly, builder, 22, Barton Road.

Liverpool.—School, Rudston Road, Score Lane; Architectural department, Municipal Buildings.

Liversedge.—Extensions to works; J. Collier & Co., Ltd.

London. — (BATTERSEA). — Rebuilding, Winstanley Road school (£38,730); L.C.C. architect, County Hall, Westminster Bridge, S.E.1. (HACKNEY).—School, Oldhill Street (£51,430); L.C.C. architect. (SHOREDITCH).—Rebuilding, Technical institute (£85,500); L.C.C. architect. (STREATHAM)—School, Leigham Court Road School (£31,550); L.C.C. architect.

Long Benton.—School (£15,685); Coxon & Doherty, Ltd.

Manchester.—Hotel at the corner of Cross Street and Ellor Street, for J. G. Swales & Co., Ltd. (£12,000), with electrical work; E. I. Newton, architect.

Middlesbrough.—Houses, near Levick Crescent; W. A. King & Sons, builders, Westbourne Grove, North Ormesby.

Newcastle-on-Tyne.—Cinema for the Odeon Cinemas, Ltd. (£60,000) at the corner of City Road and Pilgrim Street; H. Weedon, architect, 84, Colmore Row, Birmingham.

Northamptonshire.—Schools, Croyland Road, Wellingborough, Desborough, Rothwell, Duston, and Tennyson Road, Rusden, for County Council E.C.

Northern Ireland.—(BELFAST).—Cinema, Crumlin Road, Ardoyne, for the Curran Theatres; T. McLean, architect, Ocean Buildings, Donegall Square East. Extensions to works for Ulster Weaving Co., Ltd., Linfield Road.

Nottingham.—County Hall and offices, south east bank of the River Trent (£216,000); E. Vincent Harris, architect, 29, St. James's Square, London, S.W.1.

Olton.—Houses (100), Richmond Road, for the Housing Corporation of Great Britain, Ltd., 50, Pall Mall, London, S.W.1; Alban, Richards & Partners, Ltd., builders, Verdant Lane, London, S.E.16.

Orrell.—Houses (170), near Gathurst Road; T. Martlew, builder, Billinge Higher End, Upholland, near Wigan.

Penmaenmawr (CAERNARVONSHIRE).—Houses (40); E. Jones, builder, The Arcade.

Plymouth.—Flats, High Street (£20,800); A. N. Coles, Ltd.

Pontefract.—Extensions to works, King Street; Pontefract Box Co.

Portsmouth.—Houses (14), Court Lane; J. C. Nicholls. Flats Unicorn Street and Church Path (£80,000); Tanner Bros., Ltd. Mental colony, Portsdown (£214,082); city engineer.

Preston.—Houses (96), Golden Hill Lane, and Leyland Lane, Leyland; E. Hardman, architect, 5, Corporation Street, Southport.

Prestwick (AYRSHIRE).—Houses (36), Adamton Road Fields; burgh surveyor.

Reigate.—Houses (127), Battlebridge; E. Grindrod Welsby. Houses (66), Black Horse Fields; Capt. G. Waud Piercy.

Rotherham.—Extensions to Alma Road Institution (£16,500); borough engineer. Extensions to school (£22,000), for E.C.

Rugby.—Houses (102), Crick Road and Newbold; W. H. Spicer, borough surveyor.

Saltcoats.—Houses (162), New England site; A. and C. Edelman, 118, Trongate, Glasgow.

Scarborough.—Houses (90), Barrowcliff estate; borough engineer.

Scunthorpe.—Steel works adjoining Appleby-Frodingham works, for the United Steel Co.'s, Ltd.

Shrewsbury.—Houses (250), Sundorne Road; F. G. Roberts, architect, 57, Victoria Street, Wolverhampton. Houses (110), Whitchurch Road; Fletcher Estates (Harlescott), Ltd., builders, Harlescott.

Staffordshire.—School, Leek (£31,000), for County E.C.; W. Higley, builders, Pride Hill Chambers, Shrewsbury. County technical college, Stafford (£107,000), for County E.C.; Lieut.-Col. G. C. Lowbridge, M.C., education architect, County Buildings, Stafford.

Stoke-on-Trent.—Extension to Hartshill Council Junior Mixed school; William Ball & Sons (Stoke-on-Trent), Ltd., builders, Trent Vale.

Stourport.—Houses (100), Minster Road site; U.D.C. surveyor.

Stretford.—Houses (24), Barton Road estate, Lostock; E. Parker, borough surveyor. Research laboratory, Westinghouse Road; Metropolitan Vickers, Ltd.

Swansea.—Houses (182) and maisonnettes, Hanover Square; borough architect, Guildhall. Hospital (£240,000), for the Health Committee, Guildhall.

Swindon.—Houses (31), Marlborough Road; E. H. Bradley & Sons.

Teddington.—Extensions to premises for the Nation Life & General Assurance Co., Ltd., Hampton Road; Brewer, Smith & Brewer, architects, 8, The Green, Richmond.

Tipton.—Houses (58), Tibbington estate (£21,660); U.D.C. surveyor.

Torquay.—Houses (280), Cadewell estate; J. Lloyd.

Wakefield.—Houses (20), Darnley estate; Elvey & Steel.

Walsall.—Houses (28), Bentley Place; W. T. Emery. School, Harden (£17,700), for E.C. Extensions and clinic, Manor Hospital (£36,200); borough engineer.

West Bromwich.—Premises, High Street, for the Birmingham Co-operative Society, Ltd.

Woking.—School, Knaphill (£19,185); Grace & Marsh, Ltd.

Wolverhampton.—Houses, near Byhills Lane; W. Vaughan. Houses, Low Hill estate; Biddulph & Thrift. Bus garage, Park Lane, for the Corporation; Henry Vale & Sons, quantity surveyors, 21, Waterloo Road. Cinema, Penn Road; Selberg & Clift. Extensions to factory, Birmingham Road; Hobson Components, Ltd. Extensions to works, Wood Lane; Union Steel Manufacturing Co., Ltd.

Worcester.—Houses (226), Tolladine Road estate (£81,022), with electrical work; Davies & Co. (Leicester), Ltd., builders, Loughborough.

Worthing.—Houses (92), St. Andrews Road; A. C. Draycott for the Kenrite estates. Shops and flats, Goring Road and Brooklyn Avenue; Allengate Estates Co., Ltd.

Yorkshire.—School, Ardwick-le-Street (£50,750); West Riding county architect, Wakefield. School, Scalby, for North Riding E.C., Northallerton.